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Impact of Capitation Payment: The Social Security Scheme of Thailand

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Prepared by:

Winnie C. Yip, Ph.D.
Harvard School of Public Health

Siripen Supakankunti, Ph.D.
Jiruth Sriratanaban, M.D., Ph.D.
Wattana S. Janjaroen, Ph.D.
Sathirakorn Pongpanich, Ph.D.
Centre for Health Economics,
Chulalongkorn University

Partnerships
for Health
Reform
PHR

Abt Associates Inc. ■ 4800 Montgomery Lane, Suite 600
Bethesda, Maryland 20814 ■ Tel: 301/913-0500 ■ Fax: 301/652-3916

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The Partnerships for Health Reform (PHR) Project seeks to improve people's health in low- and middle-income countries by supporting health sector reforms that ensure equitable access to efficient, sustainable, quality health care services. In partnership with local stakeholders, PHR promotes an integrated approach to health reform and builds capacity in the following key areas:

- *better informed and more participatory policy processes in health sector reform;*
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- *improved incentives within health systems to encourage agents to use and deliver efficient and quality health services; and*
- *enhanced organization and management of health care systems and institutions to support specific health sector reforms.*

PHR advances knowledge and methodologies to develop, implement, and monitor health reforms and their impact, and promotes the exchange of information on critical health reform issues.

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Abstract

In 1990, Thailand introduced a Social Security Scheme (SSS), a compulsory social insurance scheme that covers formal sector private employees. The SSS contracts with hospitals (main contractors, MCs) at a capitation rate to cover all services SSS beneficiaries are entitled. The MC may contract with hospitals providing lower levels of care—subcontractors—or high levels of care—supracontractors. Employees have free choice of public and private MCs.

Using data medical records, contracting data from 1992-1998 from the Social Security Office (1992-98), SSS hospital claim records for 1998 and semi-structured interviews to collect data on internal management, this study attempted to answer the following questions. (i) What is the impact of capitation payment on the use of resources, specifically a reduction of treatment resources? (ii) What is the impact of the capitation payment on market structure? What forms of competition prevail in the SSS market? (iii) What is the impact of SSS on internal management of MC hospitals under contract and management of the subcontractors?

The study found that SSS patients, in general, use fewer resources when compared to patients paid by fee-for-service payment method. There was a general downward trend in the market concentration ratio for the SSS market due to increasing subcontracting activities. This more competitive structure was generally associated with higher costs of services for both public and private hospitals, possibly indicating quality competition. The non-SSS market structure has a very significant impact on the practice pattern for SSS patients, suggesting there is a spillover effect, in that hospitals respond to the non-SSS market structure and pass on the response equally to SSS and non-SSS patients. MCs responded to the competitive pressure of the SSS by introducing many internal management activities such as changing physician payment methods, utilization review, essential drug lists and monitoring patient complaints to the hospital structure and the sub-contractors.

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Acronyms

ALOS	Average Length of Stay
BKK	Bangkok and Vicinity
CSMBS	Civil Servant's Medical Benefits Scheme
FFS	Fee for Services
HI	Herfindhal Index
LOS	Length of Stay
MC	Main Contractor
MOPH	Ministry of Public Health
SSO	Social Security Office
SSS	Social Security Scheme
WCF	Workmen's Compensation Fund
PHR	Partnerships for Health Reform Project (USAID)
USAID	United States Agency for International Development

Foreword

Part of the mission of the Partnerships in Health Reform Project (PHR) is to advance "knowledge and methodologies to develop, implement, and monitor health reforms and their impact." This goal is addressed not only through PHR's technical assistance work but also through its Applied Research program, designed to complement and support technical assistance activities. The program comprises Major Applied Research studies and Small Applied Research grants.

The Major Applied Research topics that PHR is pursuing are those in which there is substantial interest on the part of policymakers, but only limited hard empirical evidence to guide policymakers and policy implementors. Currently researchers are investigating six main areas:

- Analysis of the process of health financing reform
- The impact of alternative provider payment systems
- Expanded coverage of priority services through the private sector
- Equity of health sector revenue generation and allocation patterns
- Impact of health sector reform on public sector health worker motivation
- Decentralization: local level priority setting and allocation

Each Major Applied Research Area yields working papers and technical papers. Working papers reflect the first phase of the research process. The papers are varied; they include literature reviews, conceptual papers, single country-case studies, and document reviews. None of the papers is a polished final product; rather, they are intended to further the research process—shedding further light on what seemed to be a promising avenue for research or exploring the literature around a particular issue. While they are written primarily to help guide the research team, they are also likely to be of interest to other researchers, or policymakers interested in particular issues or countries.

Ultimately, the working papers will contribute to more final and thorough pieces of research work, such as multi-country studies and reports presenting methodological developments or policy relevant conclusions. These more polished pieces will be published as technical papers.

All reports will be disseminated by the PHR Resource Center and via the PHR website.

Sara Bennett, Ph.D.
Director, Applied Research Program
Partnerships for Health Reform

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The Social Security Office provided data and assistance in understanding the design and operation of the Social Security System. Their guidance and assistance was of great value to the completion of the report.

Finally, we would like to thank the 12 hospitals that participated in structured interviews and shared their data with us. Their patience in providing and interpreting hospital records data was fundamental to our analysis.

Executive Summary

The majority of the empirical literature on capitation payment method focuses on its impact on costs of service provision. It does not address the black box of how incentives are passed on to hospitals and physicians, or the potential effect of capitation on market structure and its subsequent impact on cost and quality. This study represents an effort to fill this gap in the literature, using the experience of the Social Security Scheme (SSS) in Thailand.

1) The specific study questions are:

a) What is the impact of capitation payment on the use of resources? In particular, does capitation payment lead to a lower use of treatment resources when compared to other forms of payment methods?

b) What is the impact of capitation payment on the structure of the provision market for SSS? In turn, what is the relationship between market structure (e.g., market concentration) and cost of provision? What forms of competition prevail in the SSS market?

c) What is the impact of capitation payment on internal management of the hospitals under contract with the SSS (main contractors) and management of the subcontractors by main contractors (MC)?

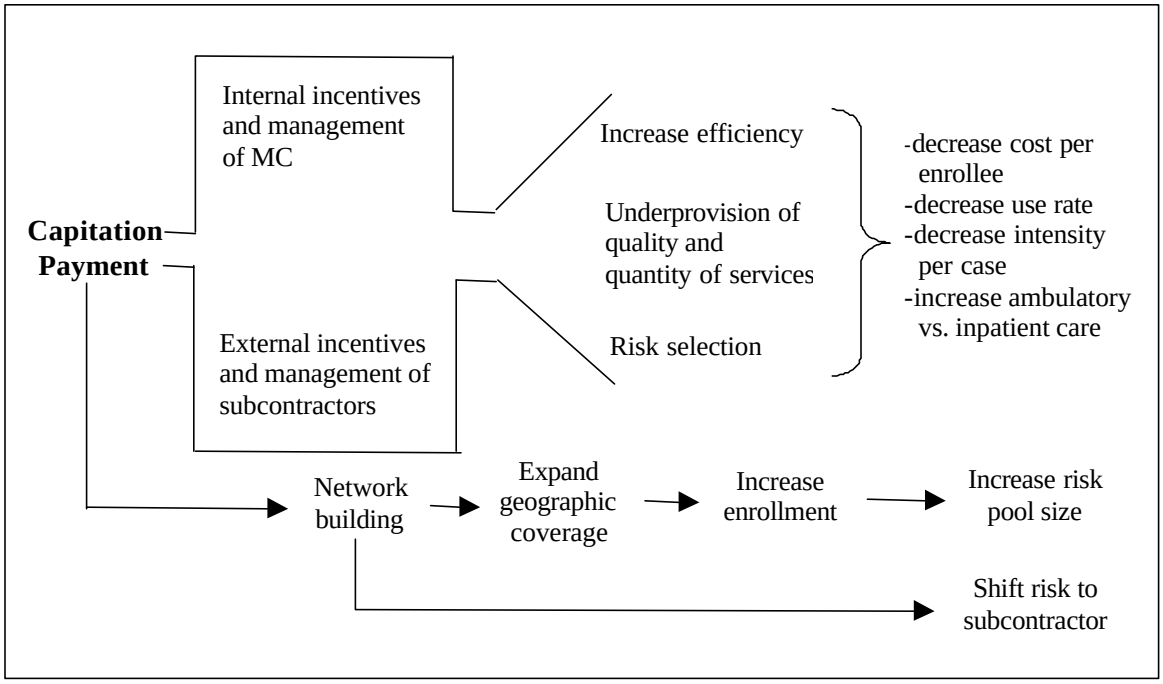
2) The SSS is a compulsory social insurance scheme that covers formal sector private employees in enterprises with 10 or more workers. Financed by contributions from employers, employees and the government, illness benefits under the SSS cover general and specialized services, outpatient services, hospital care, prescriptions, ambulance and transportation services, and ancillary services.

3) The SSS contracts with hospitals at a capitation rate to cover all services to which SSS beneficiaries are entitled under the scheme. Hospitals can enter the SSS as main contractors (MC) with licenses issued by the Social Security Office upon meeting certain standards. There is no selective contracting. In turn, the MC may contract with hospitals providing lowers levels of care—subcontractors—or high levels of care—supracontractors. Both public and private hospitals are allowed to participate. Employees have free choice of hospitals as their MCs.

4) Capitation payments turn MCs into the primary risk bearers, financially responsible for the costs of care of each enrollee under contract. Under this situation, MCs have incentives to reduce the cost of care per enrollee. To do so, MCs can improve efficiency, underprovide quality and quantity of services, and/or risk select. The extent to which MCs engage in these activities depends on how capitation incentives are passed on to the doctors and managers within the MCs (internal incentives) and to the subcontractors (external incentives).

5) Capitation payment provides MCs incentives to spread risk by increasing risk pool size and by shifting risk to subcontractors. This, in turn, gives MCs incentives to build networks through subcontracting. By doing so, MCs can expand their geographic coverage and attract more SSS beneficiaries to enroll with them. Subcontracting further allows MCs to subcontract out particular types of services that subcontractors can provide less costly.

Figure ES-1: Capitation Payment Incentives



Network building through subcontracting leads to changes in the SSS market structure as MCs expand their geographic coverage with their networks increasingly overlapping with each other. Under the SSS, private sector and free choice of providers by SSS beneficiaries should also contribute to changes in the market structure and competitive behavior among the MCs.

MCs can compete by quality and by risk selection. These two competitive strategies each have a different relationship with cost of care, as summarized in Table ES-1.

Table ES-1: Relationship between Market Concentration and Cost of Care

Strategy	Market concentration	Costs	Association between market concentration and cost
Quality	Decrease	Increase since quality is costly to produce	> Negative
Risk selection	Decrease	Decrease for MCs engaging in risk selection	> Positive
		Increase for MCs selected against	> Negative

Data are assembled from a number of sources for the analyses:

Primary data collection on medical records from a sample of nine hospitals for SSS patients and Civil Servant Medical Benefits Scheme (for public hospitals) and privately insured (for private hospitals) as control patients for five diseases (acute appendicitis, acute pyelonephritis, acute pneumonia, acute gastroenteritis, and leiomyoma of uterus).

Semi-structured interview with 12 hospitals to collect data on internal management changes and contract management between MCs and subcontractors in response to capitation payment.

Data on contracting from the Social Security Office for the period 1992-98. They include data on the number of subcontractors and for each MC, the number of beneficiaries enrolled, whether the MC was public or private, its location and the number of subcontractors. Data were also available on each subcontractor's location and whether it was public or private.

SSS claims records on hospitalizations for 1998. Each record contains data on diagnosis (up to three types) and procedure (up to four types) codes, age, and gender of the patient, hospital to which the patient was admitted, length of stay, total charge, and charges for procedures, x-ray, laboratory tests, drugs, intensive care unit, etc.

Summary of findings:

- Impact of capitation on the use of resources:
  - SSS patients, in general, use fewer resources when compared to other patients paid on a fee-for-service basis, where resources are measured in terms of length of stay, drug costs, lab test costs, and total costs per admission.
- Impact of capitation on SSS market structure:
  - The number of MCs and the number of subcontractors per MC increased over time, notably in the private sector.
  - MCs increasingly subcontract with providers outside their own districts over time.
  - There was a general downward trend in the market concentration ratio for the SSS market, especially when subcontracting is accounted for in the calculation of concentration ratio.
- Relationship between changes in SSS market structure and costs of provision:
  - Areas with more competitive SSS market structure (measured as concentration ratio or private sector growth) are in general significantly associated with higher costs of services for both public and private hospitals. One plausible explanation for the observed relationship is that MC hospitals compete for SSS beneficiaries by increasing quality of services. If indeed the result could be interpreted as quality competition, then the SSS would seem to be quite successful in motivating public hospitals to improve their quality.
  - The association between SSS market structure and costs of services is, however, only significant in the Bangkok and vicinity provinces (BKK). This result suggests that there may exist a threshold level of competition below which competitive forces do not have much influence on provider behavior, suggesting that competition may not be a viable strategy in rural areas that could not support a large number of providers.
  - Study results do not provide strong evidence for the risk selection hypothesis. If private hospitals indeed competed by risk selection, one would expect to find reductions in the SSS market concentration to be associated with lower costs of service, especially in areas with greater private sector penetration. In contrast, the study consistently found that the negative association between SSS market

concentration and SSS costs is stronger in areas with higher private sector penetration, irrespective of using cross-sectional measures or changes in private share.

- Î The non-SSS market structure has a very significant impact on the practice pattern for SSS patients, inside and outside of BKK. In general, areas with lower non-SSS-specific market concentration are associated with greater costs of treatment for SSS patients. This may suggest that there is a spillover effect, in that hospitals respond to the non-SSS market structure and pass on the response equally to SSS and non-SSS patients.

> Impact of capitation on internal management of MCs:

- Î MCs respond to capitation payment of the SSS by introducing alternative, and altering existing, internal management of the MCs, such as changing the mix of physician specialty and setting up separate committees and departments for treating SSS patients. Physician payment methods that are aimed to increase physicians' productivity and quality of services are introduced in the public sector, whereas payment methods that are aimed at having the physicians bearing a bigger share of the risk are introduced in the private sector. Similarly, utilization review, essential drug lists, and patient complaints monitoring are commonly found. Although these are often applied to both SSS and non-SSS patients, some interviewees responded that competitive pressure exerted by the SSS was a major driving force behind introducing these measures.

> Impact of capitation on management of network subcontractors:

- Î Between MCs and their subcontractors, the payment methods used by MC hospitals to reimburse subcontractors for their services varied with the ownership of the MC hospitals and the types of subcontractors—whether they were clinics and polyclinics, private hospitals or public health facilities. Utilization review was commonly found, but it was used more intensively for private clinics and polyclinics than for public health facilities. Permission for referral was a common utilization review practice. For quality assessment, random checking of medical records is the most commonly used approach.

9) The limitation of data forbids a comprehensive assessment of the capitation payment system under the SSS. Nonetheless, this study provides an overall framework that can be used to guide future research and data collection effort for evaluating the impact of capitation payment method. The findings provide useful lessons for other developing countries contemplating to implement capitation payment:

a) Capitation payment, compared to fee-for-service, can be a useful tool in reducing the cost of service.

b) Internal management changes are likely to be necessary in order for the capitation payment incentives to be fully exercised. The government may consider initially introducing capitation payment to providers that have a greater capacity to implement such companion management changes.

c) In middle- and low-income countries, where general practitioners are less well organized relative to advanced economies, capitating hospitals is an alternative and feasible strategy.

d) Capitation payment can have important implications on market structure and competitive behavior among providers subject to capitation payment incentives. It is important that policymakers understand and be able to anticipate these implications in order to design appropriate policies and necessary regulations.

e) If designed appropriately, other market mechanisms, such as private sector participation and free choice of consumers, can act to enhance the positive incentives (e.g., cost reduction) and mediate the negative incentives (e.g., quality reduction) of capitation payment.

f) Monitoring and evaluation are important to assure the proper functioning of the reform and good quality data should be collected for that purpose.

1. Introduction

Provider payment mechanisms are valuable tools for health policymakers. From fixed budget to fee-for-services (FFS), there is a wide-range of provider payment methods that can be used to achieve objectives and handle constraints within a national health system. Unique to each payment method is a set of explicit and implicit incentives that make providers behave in different ways, leading to differences in the types, volumes, and costs of services that are ultimately consumed. Institutional and organizational settings specific to each country have implications for the way in which incentives operate. Assessing the impact of provider payment methods is thus complex and requires an understanding of how institutions are organized, managed, and run. As developing countries begin to experiment with the different methods of provider payment, very little is known about the impact on health system performance.

Thailand has a wide range of health care financing schemes, including the government financed free health services for the poor, elderly, and children; the government subsidized health card scheme; the Social Security Scheme (SSS), which covers employees in the formal sector; the Civil Servant Medical Benefits Scheme (CSMBS); and private health insurance. Each scheme pays providers by different payment methods and at different rates.

Of interest to this study is the SSS, which pays providers under contract by capitation. The SSS offers a unique opportunity to study the capitation payment system for two reasons. First, it is one of the very few instances in which hospitals instead of general physicians are the primary risk bearers under the capitation contract. Second, the capitation rate covers a range of services from primary to tertiary care while, in many other cases, capitation covers only outpatient services. This study aims to analyze the experience of the SSS and the impact of capitation payment on various aspects of system performance, such as cost of service provision and market structure. The study will also attempt to examine the management changes that occurred in response to capitation payment contracts, both within hospitals under contract, and between hospitals and their subcontractors.

The next section contains a brief overview and history of Thailand's economy and health sector. Section 3 describes the SSS in more detail and presents a set of study questions and hypothesis. Section 4 discusses data and methods. Section 5 presents the findings, and Section 6 concludes.

2. Background

2.1 General Economic Condition

Thailand transformed itself from a subsistence agrarian society into a rapidly industrializing one in less than three decades. By 1990, the country was experiencing sustained economic growth, averaging 7 percent per year, that resulted from a thriving export-oriented industry.

Economic progress was accompanied by significant achievements in health development. Reductions in population growth and the infant mortality rate, along with improvements in life expectancy, contributed to Thailand's rapid demographic transition (Table 1). The Expanded Program on Immunization successfully led to a decreasing incidence of a number of infectious diseases, such as malaria and tuberculosis. At the same time, the incidence of non-communicable, chronic, and degenerative diseases is rising. However, the leading causes of illness bringing people to health centers remain infectious diseases and acute diarrhea (Kachondham and Chunharas, 1993).

Table 1: Economic and Health Indicators, Thailand

Indicators	1970	1980	1990	1998/99
GDP per capita (US$)	325 (1975)	563	1,543	1,766/1,950
Population growth rate per annum (%)	3.0	1.8	0.7	1.17
Life expectancy (M/F)	58.0/63.8 (1975)	62.6/68.1	65.9/70.6	67.4/71.8
General mortality rate	20	14.5	4.5	5.2
Infant mortality rate	25.5	13.3	8.0	4.5

Sources: Adapted from Bank of Thailand, Ministry of Public Health reports.

2.2 The 1997 Economic Crisis and Its Impact on the Health Sector

The rapid economic growth between 1988 and 1993 led to a much stronger Thai economy. The Thai government liberalized the financial markets in 1993, which resulted in over-borrowing for investment and non-productive goods. This, compounded with a rising consumption of luxury import items and decreased export competitiveness, led to a large deficit. In July 1997, the government declared a floating Baht. This marked the beginning of the economic crisis, resulting in a striking devaluation of the Baht from 25 to more than 57 per U.S. dollar in December 1997.

The financial crisis had important implications for social and economic conditions in Thailand. The obvious social impacts were the increase in unemployment and the consequent loss of income, affecting the poorest and most vulnerable population, whose share on health spending averaged 10 percent of their income, compared to only 2 percent by the wealthy.

Another important impact of the financial crisis was on health care delivery. Private hospitals were heavily affected by the financial crisis. In addition to the reduction in demand for their services,

they experienced a loss of roughly Baht 10 billion from devaluation. A number of private hospitals faced the risk of closure, particularly since there had already been an oversupply.

2.3 Health Care Financing

A wide range of health care financing schemes exists in Thailand, covering nearly 70 percent of the population. Table 2 provides a summary of the schemes and their major characteristics.

Table 2: Summary of Financing Schemes

Scheme	Population covered (%) 1995	Provider 1999	Source of funds	Provider payment method
Free medical care	43.9	Public	General tax	Historical budget
Civil Servants Medical Benefit	9.6	Public	General tax	FFS
Social Security Scheme	7.3	Public/ Private	Tripartite	Capitation
Workers' Compensation Fund		Public/ Private	Employer	FFS
Health cards	7.8	Public (MOPH)	Household and general tax	Capitation and budget
Private health insurance	2	Public/ Private	Household	FFS

Source: Ministry of Public Health, Supakankunti, 2000; Bitran and Yip, 1998; Mongkolsmai, 1997.

The Ministry of Public Health's (MOPH) low-income card scheme, for which households apply, exempts poor households from fees at public health facilities on condition that they observe the referral system. The CSMBS, financed by government revenues, covers civil servants, pensioners, and their dependants. All outpatient and inpatient services in the public sector are covered by the scheme. Providers are reimbursed on an FFS basis. The Workman's Compensation Fund covers employees in firms and is financed through payroll tax contributions by employers. The health card system is a voluntary health insurance program targeted at the near poor and middle-income class in rural areas (Supakankunti, 2000).

2.4 Health Care Delivery

Delivery of health care in Thailand makes use of both public and private providers. Inpatient care is provided by public hospitals financed and operated by the government (MOPH, other ministries, state enterprises, and municipalities), private hospitals, and voluntary not-for-profit hospitals. Outpatient clinics consist of public health centers and private clinics. MOPH hospitals are the major health care providers in provinces outside Bangkok. The number of private hospitals increased rapidly between 1988 and 1993, following the economic boom, growing at a rate of 5

percent per annum, compared to 2 percent per annum for public hospitals. Private hospitals are largely concentrated in Bangkok and surrounding provinces.

Rapid growth in the private hospital sector has both supply and demand causes. On the demand side, substantial income growth and improved education contributed to the public's demand for quality of services that was not fulfilled by public hospitals. On the supply side, much of the growth is attributable to factors outside of the health sector, such as the general macroeconomic environment and tax incentives, which stimulated private sector expansion (Bennet and Tancharoensathien, 1994). In particular, Board of Investment incentive measures that extended to private hospitals contributed to private sector growth.

2.5 Utilization of Health Care

Households pay nearly half of all health expenditures in Thailand. The National Health Accounts estimate of total expenditures in Thailand was Baht 3,051 million in 1994. Of this, households paid 44.38 percent, MOPH 28.56 percent, CSMBS 7.76 percent, local government 4.34 percent, other ministries 3.8 percent, and Social Security 2.7 percent (Tancharoensathien et al., 1999).

According to socioeconomic surveys carried out in 1994 and 1998, households spent about 6.0 percent and 2.7 percent of their monthly expenditure on medical care in 1994 and 1998, respectively. It should however be noted that the differences may be due to reporting changes between the two years. Nearly 18 percent (17.8 percent) of this amount in 1998 was spent on medicine and supplies purchased from pharmacies for self-treatment, 65.4 percent was for outpatient medical services, and 16.8 percent was for inpatient medical services.

3. Study Objectives and Hypothesis

3.1 The Social Security Scheme

In 1990, the Social Security Scheme was introduced with the objectives of reducing inequity in access to health care of different population groups, and providing financial security to formal sector private employees. The act governing the scheme was enacted in September 1990 and came into effect in March 1991. Originally the SSS covered employees or enterprises with 20 or more workers, but it was later extended to enterprises with 10 or more workers in September 1993. The SSS is compulsory and receives contributions from employers, employees, and the government, each paying a fixed percent of the employee's wages. Illness benefits consist of general and specialized services, outpatient services, hospital care, prescriptions, ambulance and transportation services, and ancillary services.

The Social Security Office (SSO) collects funds and purchases health services from both public and private hospitals at a capitation rate to cover all services to which SSS beneficiaries are entitled under the scheme. The capitation payment is a fixed payment per worker per year regardless of service utilization. Hospitals enter the SSS as main contractors (MC) with licenses issued by the SSO upon meeting certain standards set out by the Medical Committee. There is no selective contracting. In broad terms, the hospital must have at least 100 beds, a good referral system, and be well equipped with all types of necessary facilities (Mongkolsmai, 1997). Certain conditions are excluded from the capitation rate. These are usually high cost medical procedures such as open-heart surgery, chronic renal dialysis, cosmetic surgery, and organ transplant (except bone marrow). They are paid by fee-for-service according to a fee schedule. The MC may contract with hospitals providing lower levels of care—subcontractors—or high levels of care—supracontractors. In 1998, the capitation rate was raised from Baht 700 (US$ 17.50) to Baht 1000 (US$ 25) for the first 50,000 registered beneficiaries and Baht 900 for each beneficiary beyond 50,000 (SSO, 1999). In light of the economic downturn and sufficient reserves in the Social Security Fund, contribution rates have been reduced from 1.5 percent to 1 percent for the employers, employees, and the government.

The outpatient utilization rate under the SSS increased from 0.78 visits/person/year in 1991 to 1.52 in 1997. During the same period, inpatient utilization rate decreased from 0.036 to 0.034 admissions/person/year. Payments for beneficiaries increased from 34.19 percent to 62.29 percent of total contributions during the same period (SSO, 1998). The initial low level of utilization was due to a lack of understanding on the part of the insured about the benefits that they were entitled to receive from the scheme. Moreover, employers initially chose MCs for their employees, a decision that was determined more by workplace location than by accessibility to employees from their homes (Tangcharoensathien et al., 1999). Since 1993, however, employees have been able to choose their own MC hospital. The initial low utilization levels meant that hospitals entering into SSS contracts experienced health expenditures below capitation rates. SSS patients were regarded as 'profitable'; hospitals began to compete for SSS patients. This competition led to the formation of provider networks, which expanded geographical coverage and improved access to the insured, thus attracting more insured persons to register. Hospitals also changed their internal management and marketing strategies to cater to the needs and tastes of SSS beneficiaries (Sriratanaban et al., 1998).

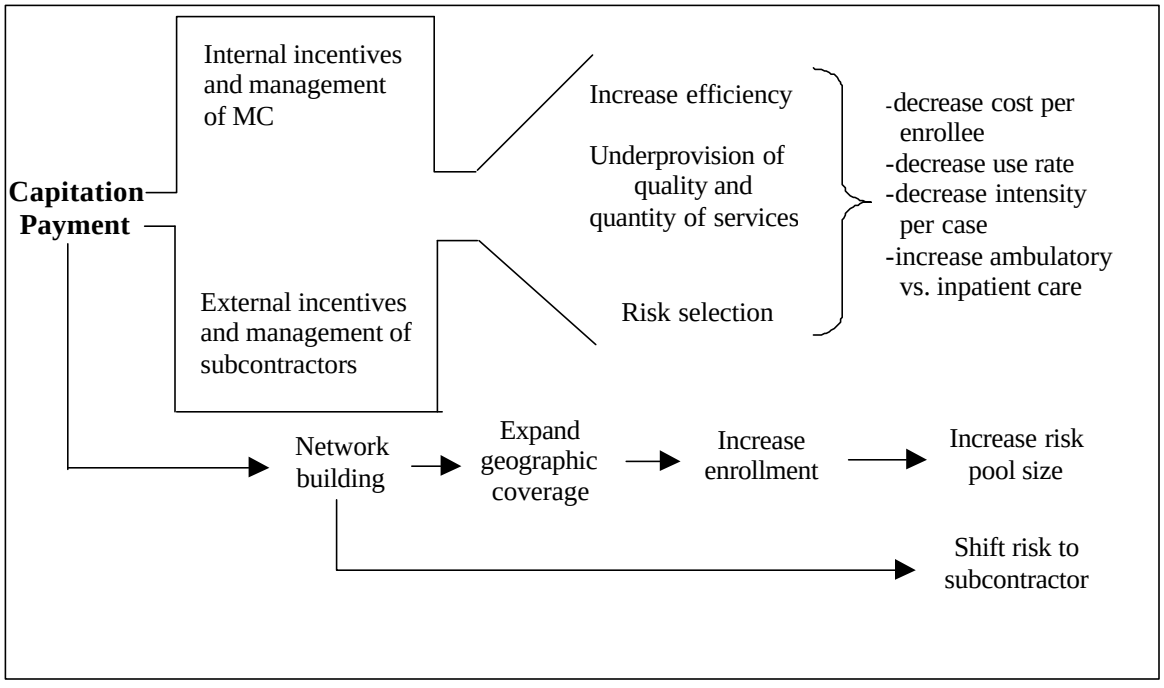
With worker choice of provider and consequently higher utilization rates, profit margins on SSS patients have probably been eroded. But the large excess capacity in many private hospitals still makes the SSS attractive to providers.

3.2 Incentives under Capitation

Capitation has turned the MC hospital into a financial risk bearer. Under this situation, MCs have incentives to reduce the cost of care per enrollee. To do so, MCs can improve efficiency, underprovide quality and quantity of services, and/or risk select. The extent to which MCs engage in these activities depends on how capitation incentives are passed on to the doctors and managers within the MC hospital (internal incentives). For instance, hospitals may institute utilization review, an essential drug list, or change physician payment methods. Similarly, incentives and management exercised on the subcontractors (external incentives) can affect the extent and effectiveness of cost control.

MCs also have incentives to spread risk by increasing risk pool size and by shifting risk to subcontractors. Expanding the risk pool implies that the MC is less sensitive to any particular enrollee with above or below average risk. This, in turn, gives the MC incentive to build networks. By doing so, MCs can expand their geographic coverage and attract more SSS beneficiaries to enroll with them. By subcontracting, the MC can also choose to subcontract out for particular types of services that it does not provide efficiently. In addition, the MC can transfer at least a portion of its own risk to the subcontractor, for instance, by paying subcontractors through capitation. Figure 1 summarizes the different incentives.

Figure 1: Capitation Payment Incentives



3.3 Capitation and Market Structure

While a number of existing studies analyze the effect of capitation payment on the cost of care, few studies examine the effect of capitation on both competition/market structures.

Figure 2 illustrates the different scenarios by which subcontracting can either increase or decrease market concentration. In the base scenario, there are two markets, X and Y. Market X has two MC's, MC(A) and MC(C), and MC(A) has two subcontractors within market X. Market Y has one MC, MC(B). There are no subcontractors in market Y. In scenario 1, MC(A) subcontracts with another MC, MC(C) and therefore reduces competition in market X. In scenario 2, MC(C) subcontracts with two providers in market X, and directly competes with MC (A). In scenario 3, MC(A) extends its network to market Y through subcontracting, thereby capturing some of the market power from MC(B). In scenario 4, a number of additional MC's enter both market X and market Y. The market concentration in both markets decreases. Finally, in scenario 5, MC(A) subcontracts with two providers, one in market X and one in market Y. In doing so, MC(A) captures additional market power in both markets. Market concentration increases in market X, whereas market concentration decreases in market Y. In sum, the effect of networking on market concentration is unpredictable; it depends on the form and location of subcontracting.

Figure 2: Relationship between Subcontracting and Market Concentration

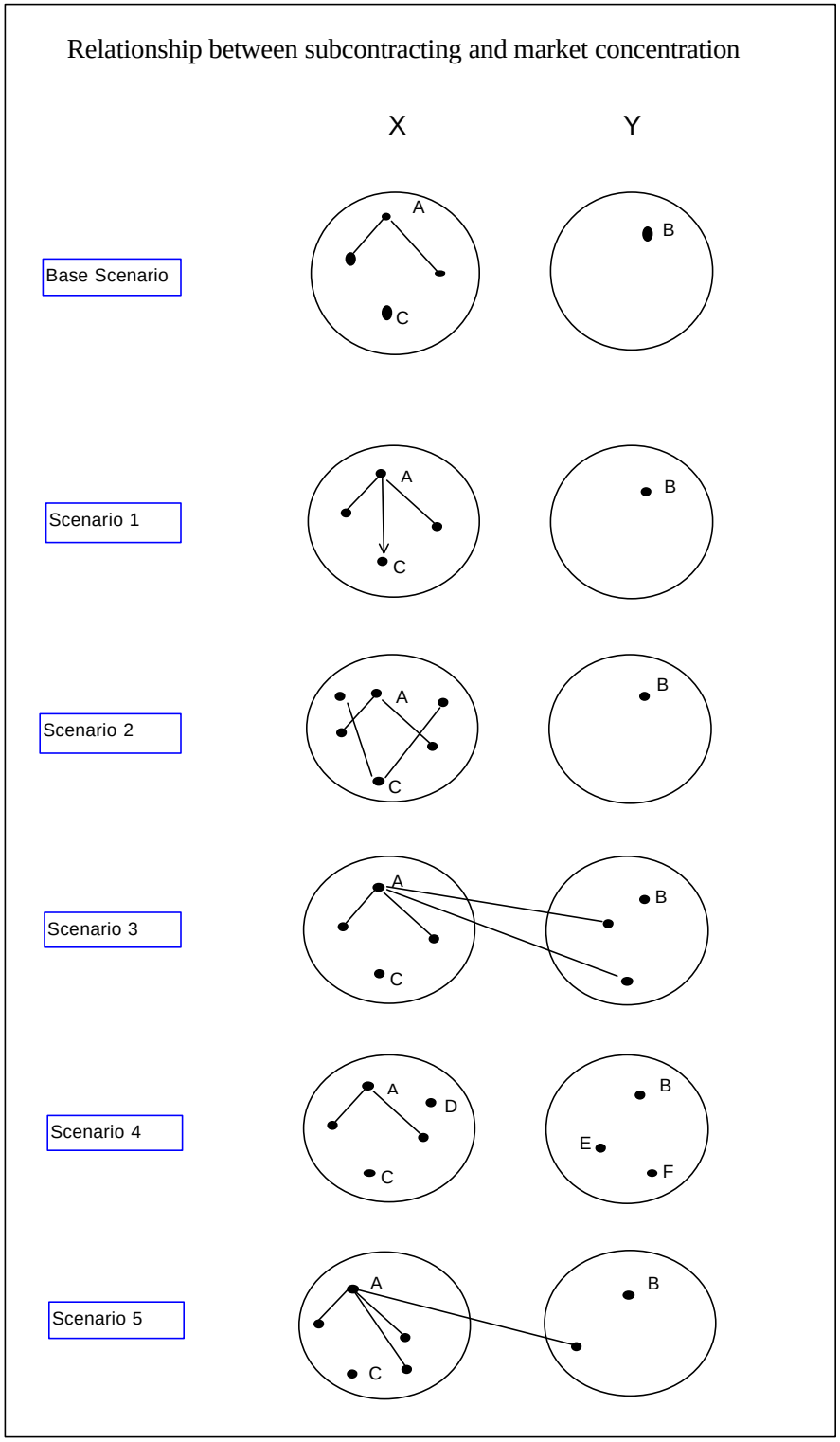


Table 3 summarizes the change in market concentration according to each scenario.

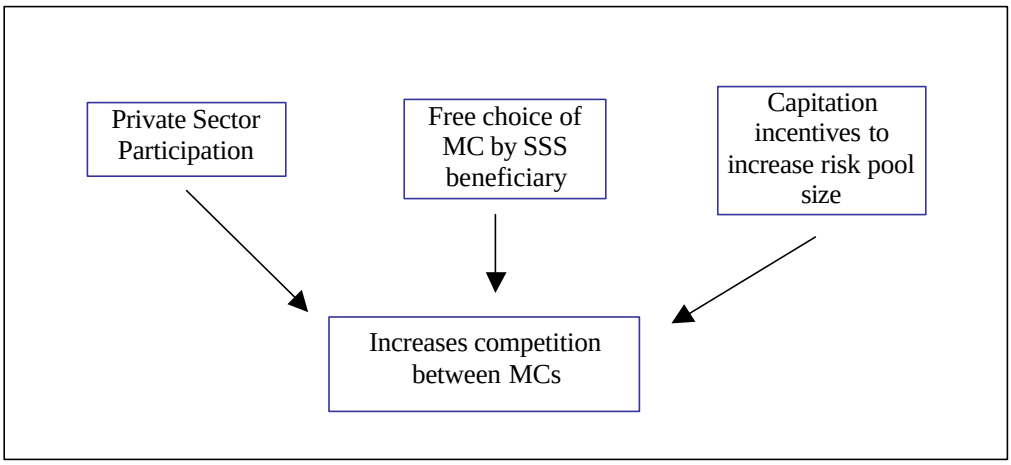
Table 3 Change in Market Concentration According to Each Scenario.

	Market X	Market Y
Base	NA	NA
Scenario 1	↑	--
Scenario 2	↓	--
Scenario 3	--	↓
Scenario 4	↓	↓
Scenario 5	↑	↓

3.4 Association between Market Concentration and Cost

In addition to the capitation instituted by the SSS, two other factors affect market competition, private sector participation, and free choice of MC by SSS beneficiary (illustrated by Figure 3). First, the public hospitals have incentives to compete for the SSS contracts, since any remaining revenue after the costs for direct service provision or subcontracting are subtracted, belong to the hospitals and can be used flexibly. The entrance of private hospitals made public hospitals aware that they have to increase their attractiveness to the SSS beneficiaries in order to compete with the private hospitals, which are usually perceived by consumers as having better quality. Second is that free choice by consumers to choose and to change providers as MCs provide hospitals incentives to improve their attractiveness to the consumers as well.

Figure 3: Factors Affecting Competition



As market structure changes, we hypothesize that MCs may compete by two, not necessarily mutually exclusive, strategies (conduct) (Table 4). The first is by increasing quality. Since employees face zero cost in choosing providers under the SSS, competing by price is not an option. Instead, providers will compete by increasing quality (Gravelle, 1999). Quality can take the form of better facilities, longer time spent with the physician, easier access in the form of shorter waiting time for appointment and shorter travel distance, etc. This strategy assumes that enrollees care about quality,

are able to identify quality and make their choice based on quality. The second strategy is risk selection. In health care markets, consumers often do not have perfect information about their providers and quality of services. Under imperfect information, when providers are subject to competition and prospective payments such as capitation, providers have incentive to provide less than optimal service to patients and risk select, that is, dump the most costly (sickly) patients (Rogerson, 1994; Ma, 1994, Ellis, 1998). This is particularly true when the capitation payment rate is not adjusted, as is the case in Thailand.

Table 4: Relationship between Market Concentration and Cost of Care

Strategy	Market concentration	Costs	Association between market concentration and cost
Quality	Decrease	> Increase since quality is costly to produce	> Negative
Risk Selection	Decrease	> Decrease for MCs engaging in risk selection > Increase for MCs selected against	> Positive > Negative

3.5 Study Objectives

Given data limitations, this study does not intend to provide a comprehensive evaluation of the capitation payment system of the SSS. It focuses on answering the following three questions:

1. What is the impact of capitation on the use of resources? In particular, does capitation payment lead to lower expenditures when compared to other forms of payment methods? Does capitation payment lead to the use of more outpatient vs. inpatient care?

2. What is the impact of capitation on SSS market structure, in particular, what is the relationship between market concentration and cost of provision? What forms of competition prevail in the SSS market?

3. What is the impact of capitation on internal management and management of network subcontractors?

4. Methodology, Data and Findings

4.1 Impact of Capitation on Resource Use

4.1.1 Methods

The ideal methodology for measuring the impact of capitation is a pre- and post- comparison of the medical expenditures for an experimental group (change from fee-for-service to capitation) and a control group (remain FFS throughout pre- and post- period). Since capitation has been the mode of payment used since the inception of SSS and there was no phase-in of the program by population group or geographic area, no pre/post comparisons could be made. The method chosen instead was to compare the cost experience of the SSS with other programs paid for by FFS. CSMBS patients formed the comparison groups for SSS patients treated at public hospitals. Private patients formed the comparison group in private hospitals. Among private patients, some were privately insured, but the majority were patients from self-insured employers, who usually pay providers by FFS.

The rate of use could not be assessed since population-based data were not available. Similarly, since outpatient records were either not kept or not stored in easily accessible format by the SSO or the hospitals, this study cannot assess the choice of outpatient/ambulatory vs. inpatient care conditional on disease type. The focus of the study will be on inpatient utilization (length of stay, LOS) and costs.

A number of indicators were used to evaluate costs and utilization. These include average length of stay (ALOS), average charge per admission, average drug and lab charge per admission, and average physician charge per admission. Comparisons were made separately for each diagnosis, and t tests were performed to assess statistical significance of the difference in means between the SSS and the control population. To explore the possibility of outliers, the median for each cost indicator was calculated in addition to the mean. For the most part, the mean did not differ from the median sufficiently to suspect bias due to outliers.

Finally, the issues surrounding cost measurement in medical care is a persistent challenge, since charges are distinct, in economic terms, from costs. Throughout the analysis, provider charges are used as a proxy for costs. Since hospitals under SSS do not actually charge on a FFS basis, the data available are derived from hospital reports of charges for SSS patients. There are no incentives for providers to bias the charges either up or down.

4.1.2 Data

SSO data consist only of claims records for SSS beneficiaries. To allow for comparison with the CSMB and private patients, medical claims records were directly collected from hospitals. Data were collected for the period April–October 1999. Focus is on five tracer conditions: (i) acute appendicitis, (ii) acute gastroenteritis, (iii) leiomyoma of uterus, (iv) acute pneumonia, and (v) acute pyelonephritis. The variables collected include data on patients' age, sex, diagnosis, date of admission, date of discharge, total charge, drug charge, laboratory charge, and LOS; the data also

include information on hospital ownership. There were several reasons why these disease conditions were chosen. First, they are relatively easy to identify. Second, the severity does not vary greatly within each disease group. Finally, doctors have a considerable degree of discretion over the treatment offered to each of the five tracer conditions, making it easier to identify how payment systems affect the types of services provided. To keep the project budget manageable, the number of medical records obtained was capped at 200 per year for each diagnosis for each hospital.

In selecting public hospitals to be included in the sample, preference was given to those that are participating in the DRG (diagnosis-related group) studies that require participating hospitals to standardize their medical records. Among private hospitals, priority was given to those that have a sufficiently large share of privately insured patients that are subject to private insurance review, a process that would require them to keep good medical records. An equal number of public and private hospitals were chosen initially. However, many private hospitals refused to participate and were replaced by public hospitals.

Twelve public and private main contractor hospitals in the SSS were eventually selected for the study.

Table 5 provides the primary hospital characteristics of the main contractor hospitals in the survey.

Table 5. General Characteristics of the Selected MC Hospitals

1. Ownership of MC hospitals	
Public hospitals	
MOPH	4
University	1
Military	1
Bangkok Metropolitan Administration	1
The Red Cross	2
Private for-profit hospitals	3
2. Types of MC hospitals	
Teaching hospitals	3
Non-teaching hospitals	9
3. Location of MC hospitals	
Bangkok	6
Vicinity of Bangkok	2
Rural areas	4
4. Size of MC hospitals	
100-300 beds	5
301-500 beds	2
More than 500 beds	5

There have been various problems in conducting data collection for this study. Most of the databases were not computerized, or were only partially computerized. This is particularly true with regard to the cost data. While there was good collaboration from most of the hospitals, the staff assigned to help the research team was generally already extremely busy with their regular activities. Furthermore, because of confidentiality, some hospitals were reluctant to release patient records information.

A total of 1,545 patient records were collected. Of these, 530 were from private sector hospitals, and 1,015 were from public hospitals. Generally, there were no notable differences in the distribution of cases under each type of facility (public or private) and insurance type.

For pneumonia, 61 cases were collected from private hospitals, 27 cases from SSS hospitals, and 34 for non-SSS hospitals. Of the 27 SSS cases, 21 came from one hospital, which did not have control cases. Of the 34 non-SSS cases, 30 came from another hospital that had only two SSS cases. Researchers therefore excluded pneumonia for our analysis for private hospitals.

To validate the hospital medical records, the SSS samples were compared with records from the SSO database. Table 6 provides an overview of the results of the validity check. It shows that medical record results are close to those obtained through the SSO database, with one slight difference. Length of stay is, in general, longer in the hospital record data relative to the SSO data. Approximately 5 to 8 percent of cases in the SSO database have a LOS of zero, whereas no such cases exist for the hospital record data. This may be due to the way in which hospital records are maintained. Differences between the hospital record and the SSO data may also be due to the small sample size of the medical records collected.

However, overall there is no evidence to suggest that medical record results are not representative of the average costs of SSS patients in Thailand.

Table 6: Validity Checks on Data by Disease

	SSO database	Hospital records	SSO database	Hospital records
	Public		Private	
Appendicitis				
LOS	4.2	3.8	3.3	3.5
Total charge per admission	7,860	7,064	20,405	14,030
Drug charge per admission	1,780	1,567	5,752	3,635
Lab charge per admission	266	317	654	787
Doctor charge per admission	NA	NA	NA	2,937
Gastroenteritis				
LOS	1.9	2.3	1.6	2.0
Total charge per admission	1,363	1,544	4,660	3,901
Drug charge per admission	595	610	1,990	1,320
Lab charge per admission	224	229	440	450
Doctor charge per admission	NA	0	NA	848

	SSO database	Hospital records	SSO database	Hospital records
	Public		Private	
Leiomyoma of uterus				
LOS	7.2	8.8	4.1	4.9
Total charge per admission	11,330	9,838	29,709	28,496
Drug charge per admission	1,300	1,914	6,818	5,590
Lab charge per admission	578	583	1,611	1,068
Doctor charge per admission	NA	NA	NA	4,141
Pneumonia				
LOS	6.3	6.0	4.8	7.8
Total charge per admission	5,506	4,781	15,694	14,232
Drug charge per admission	2,814	3,106	8,144	7,211
Lab charge per admission	505	483	1,208	1,217
Doctor charge per admission	NA	0	NA	1,540
Pyelonephritis				
LOS	3.9	4.8	3.2	3.6
Total charge per admission	3,359	2,767	9,693	9,215
Drug charge per admission	1,564	1,651	4,845	4,162
Lab charge per admission	351	282	656	755
Doctor charge per admission	NA	3,750	NA	1,676

4.1.3 Findings

Table 7 shows the distribution of outpatient vs. inpatient expenditure for SSS and CSMBS. Relative to CSMBS, which pays providers by FFS, SSS has a larger share of outpatient care. This result supports the hypothesis that capitation provides motivation for providers to use lower cost alternatives to hospital inpatient care whenever possible. This result is, however, far from conclusive since the study does not control for case mix or characteristics of the population covered under SSS or CSMBS.

Table 7: Total Expenditure by Level of Care, 1996 and 1998 (Baht Million)

	SSS		CSMBS	
Year	***1996***	***1998***	***1996***	***1998****
Expenditure on outpatient care	1465 (50%)	2094 (52%)	4826 (36%)	5866 (36%)
Expenditure on inpatient care	1485 (50%)	1926 (48%)	8761 (65%)	10574 (64%)
Total expenditure	2951	4021	13587	16440

Source: Thai National Health Account Phase II, Preliminary results.
Note: * For CSMBS in 1998 excluding private provider except for emergency only.

Tables 8-12 compare the mean (median) ALOS, total charge, drug charge, lab test charge, and doctor's charge (for private hospitals) for SSS and FFS patients. In the public hospital sample, SSS cases have lower ALOS and lower cost than their CSMBS counterparts for all the five diseases, and many of the differences are statistically significant. The exception is ALOS for leiomyoma of uterus for which SSS patients, on average, spend 1.3 days longer than CSMBS patients. This pattern is found in all public hospitals in the sample.

In the private hospital sample, SSS patients also have lower cost and lower ALOS for most cases; however, the cases for which the differences are statistically significant are fewer when compared to the public hospital sample. For leiomyoma of uterus, SSS patients, in fact, spend significantly more drug cost (and total cost) than the privately insured control group. This result seems to be driven by one of the three private hospitals in the sample.

There are several possible explanations for the general findings of lower intensity in resource use for SSS patients observed in both public and private hospitals. First, by turning hospitals into the primary risk bearer of financial outlay, capitation payment might encourage the hospitals to provide more efficient care to SSS patients than to FFS patients. Prescriptions of unnecessary diagnostic tests and procedures, as well as unneeded medications were reduced. Second, capitation payment may provide incentives for hospitals to lower their standard of treatments, such as use of cheaper drugs that might be locally made. Third, since we observe charge, but not cost, data, the lower charges among SSS patients might be due to the practice of differential pricing by the hospitals to patients under different insurance schemes. In particular, some public hospitals may increase charges to the CSMBS patients to cross-subsidize care for the indigent. It was also possible for private hospital to engage in such practices. However, it is beyond the scope of this study to find definite answers. Further investigations into these issues should be conducted.

Table 8: Appendicitis (mean, sd, n, median)

	Public hospitals			Private hospitals		
	SSS	**CSMBS**	**t value**	**SSS**	**Private**	**t value**
Average length of stay	**3.8**	**4.7**	**-2.83**	**3.5**	**4.6**	**-2.79**
	2.1	3.2		1.6	2.9	
	160	138		84	59	
	3	4		3	4	
Total charge	**7064**	**11683**	**-6.83**	**14030**	**16949**	**-1.84**
	4410	7114		7281	11708	
	160	138		84	59	
	6510	10291.5		14360	11852	
Drug cost per case	**1567**	**3429**	**-5.02**	**3635**	**3018**	**1.20**
	1790	3954		3109	2916	
	139	128		84	59	
	1122	2356.5		2985	2550	
Lab cost per case	**317**	**588**	**-4.42**	**787**	**1151**	**-4.35**
	281	685		295	673	
	148	135		82	59	
	250	350		750	860	
Doctor cost per case	**NA**	**NA**		**2937**	**6860**	**-6.97**
				2156	3052	
				59	29	
				4450	6530	

Note: NA = not available

Table 9: Gastroenteritis (mean, sd, n, median)

	Public hospitals			Private hospitals		
	SSS	**CSMBS**	**t value**	**SSS**	**Private**	**t value**
Average length of stay	**2.3**	**4.6**	**-2.89**	**2.0**	**4.3**	**-2.15**
	2.2	8.3		1.6	8.6	
	115	119		65	92	
	2	3		1	3	
Total charge	**1544**	**5206**	**-5.07**	**3901**	**5789**	**-1.94**
	1864	7529		3602	7217	
	115	117		65	90	
	940	3204		2490	3959.5	
Drug cost per case	**610**	**1377**	**-3.19**	**1320**	**1597**	**-0.54**
	762	2465		1160	4007	
	115	117		65	91	
	410	649		941	810	
Lab cost per case	**229**	**809**	**-3.42**	**450**	**742**	**-0.71**
	379	1781		567	1326	
	115	116		11	55	
	110	368		235	355	
Doctor cost per case	**-**	**-**	**-**	**848**	**1210**	**-2.58**
	-	-		802	751	
	0	0		60	62	
	NA	NA		750	1010	

Note: NA= not available

Table 10: Leiomyoma of uterus (mean, sd, n, median)

	Public hospitals			Private hospitals		
	SSS	**CSMBS**	**t value**	**SSS**	**Private**	**t value**
Average length of stay	**8.8**	**7.5**	**1.89**	**4.9**	**8.4**	**-6.28**
	4.4	3.5		1.8	2.9	
	49	104		35	36	
	7	7.5		4	8	
Total charge	**9838**	**14432**	**-5.14**	**28496**	**22462**	**2.30**
	5931	4749		11892	10192	
	49	104		35	36	
	8195	14428		28412	17589	
Drug cost per case	**1914**	**2341**	**-1.32**	**5590**	**1593**	**6.74**
	1427	2026		2928	1990	
	48	104		35	36	
	1432.5	1724		6037	697.5	
Lab cost per case	**583**	**824**	**-1.87**	**1068**	**1450**	**-2.46**
	422	731		716	580	
	36	104		34	36	
	515	610		830	1370	
Doctor cost per case	**NA**	**NA**		**4141**	**10277**	**-3.28**
				4317	3338	
				30	6	
				1040	8860	

Note: NA= not available

Table 11: Pneumonia (mean, sd, n, median)

	Public hospitals		
	SSS	**CSMBS**	**t value**
Average length of stay	**6.0** 7.8 42 4	**7.8** 8.5 115 5	**-1.22**
Total charge	**4781** 9371 41 2352	**13715** 16160 110 7202.5	**-3.33**
Drug cost per case	**3106** 6789 42 1600.5	**7602** 11716 114 3022.5	**-2.34**
Lab cost per case	**483** 844 40 265	**2458** 5375 114 875	**-2.31**
Doctor cost per case	NA	NA	

Note: NA = not available

Table 12: Pyelonephritis (mean, sd, n, median)

	Public hospitals			Private hospitals		
	SSS	**CSMBS**	**t value**	**SSS**	**Private**	**t value**
Average length of stay	**4.8**	**5.3**	**-0.82**	**3.6**	**4.9**	**-3.35**
	3.3	3.8		2.1	1.7	
	81	92		56	42	
	4	4		3	5	
Total charge	**2767**	**7075**	**-5.25**	**9215**	**9754**	**-0.29**
	2190	7048		6860	11418	
	80	92		56	42	
	2205.5	4819		7366.5	5467.5	
Drug cost per case	**1651**	**2931**	**-3.25**	**4162**	**3161**	**1.33**
	1576	3216		3534	3907	
	81	91		56	42	
	1133	1707		3451	1738	
Lab cost per case	**282**	**756**	**-5.69**	**755**	**1451**	**-2.77**
	308	690		600	1135	
	81	90		24	38	
	210	520		662.5	1022.5	
Doctor cost per case	NA	**NA**		**1676**	**1660**	**0.05**
				1227	546	
				54	17	
				1262.5	1650	

Note: NA= not available

To control for individual hospital-specific unobservable factors that may be correlated with treatment patterns for SSS and FFS patients, the study also estimated fixed effects models by including a dummy variable for each hospital. For example, some of the public hospitals may establish a reputation for treating severe cases among the civil servants; thus their cost experience would be higher than average irrespective of payment incentives. The fixed effects model allows comparison of SSS against CSMBS/private patients "within" rather than "between" hospitals. Table 13 shows that, for most cases in the public sample, the fixed effects results are similar to those presented in Tables 8-12, except for the leiomyoma of uterus drug charge and the pneumonia lab charge. For the private sample, the results are rather different, especially for leiomyoma of uterus and pyelonephritis. These two procedures also have smaller sample sizes, showing that the non-fixed effect results may be quite sensitive to unobserved hospital practices. For leiomyoma of uterus, the higher SSS cost (total and drug) for patients treated in private hospitals (observed in Table 10) disappears when fixed effects are included; however, the ALOS and lab charge results are weaker. For pyelonephritis, while the LOS results are more significant, the total charge results disappear when fixed effects are controlled for. Discrepancies between the fixed-effect and non-fixed-effect results suggest that the some of the differences between SSS and FFS patients observed in Tables 8-12 are due to variations among hospitals, rather than variations between the SSS and FFS patients within the same hospital.

Table 13: Fixed Effects Model

	Public hospitals		Private hospitals	
	Difference in means (SSS-CSMBS)	**t-stat**	**Difference in means (SSS-Private)**	**t-stat**
Appendicitis				
LOS	-0.9	-3.1	-0.9	-2.4
Total charge	-5,126	-7.9	-5,297	-4.4
Drug charge per case	-2,000	-5.5	18	0.0
Lab charge per case	-260	-4.8	-365	-4.3
Doctor charge per case	-728	-1.3	-4,375	-8.5
Gastroenteritis				
LOS	-1.6	-2.0	-1.0	-0.9
Total charge	-3,249	-4.5	-1,614	-1.6
Drug charge per case	-778	-3.2	-116	-0.2
Lab charge per case	-688	-1.9	-254	-0.6
Doctor charge per case	NA	NA	-373	-2.9
Leiomyoma of uterus				
LOS	1.8	2.6	-1.1	-1.6
Total charge	-4,120	-4.5	-9,941	-5.5
Drug charge per case	-1,378	-5.0	-120	-0.3
Lab charge per case	-169	-1.6	-328	-1.6
Doctor charge per case	NA	NA	-4,483	-3.4
Pneumonia				
LOS	-0.3	-0.2	-	-
Total charge	-6,409	-2.4	-	-
Drug charge per case	-3,781	-1.9	-	-
Lab charge per case	-542	-0.7	-	-
Doctor charge per case	NA	NA	-	-
Pyelonephritis				
LOS	-0.4	-0.6	-0.8	-1.4
Total charge	-5,171	-5.8	-7,884	-3.4
Drug charge per case	-1,773	-4.3	-1,656	-1.7

	Public hospitals		Private hospitals	
	Difference in means (SSS-CSMBS)	t-stat	Difference in means (SSS-Private)	t-stat
Lab charge per case	-376	-4.6	-1,111	-3.5
Doctor charge per case	NA	NA	-443	-1.5

Note: t-statistic reported at 95 percent confidence interval
NA = not available

4.2 Impact of Capitation on Market Structure

4.2.1 Methods

In addition to documenting changes in the numbers, types, and size of hospitals, researchers also examined changes in market concentration. Market concentration was measured using the Herfindhal Index (HI). The HI is a commonly used measure of market concentration in economic literature. HI is calculated as follows:

$HI = S(s_i)^2$, *where s = market share of firms i…n.*

To calculate HI, the market first needs to be defined. Defining the market using the patient-flow method, however, requires substantial data that are not available in Thailand. The current analysis uses a geographical unit to approximate a market. Three types of HI are calculated. The first method (HI_P) relies on province-level data to calculate HI, and two methods use district-level data (HI_D1 and HI_D2, respectively).

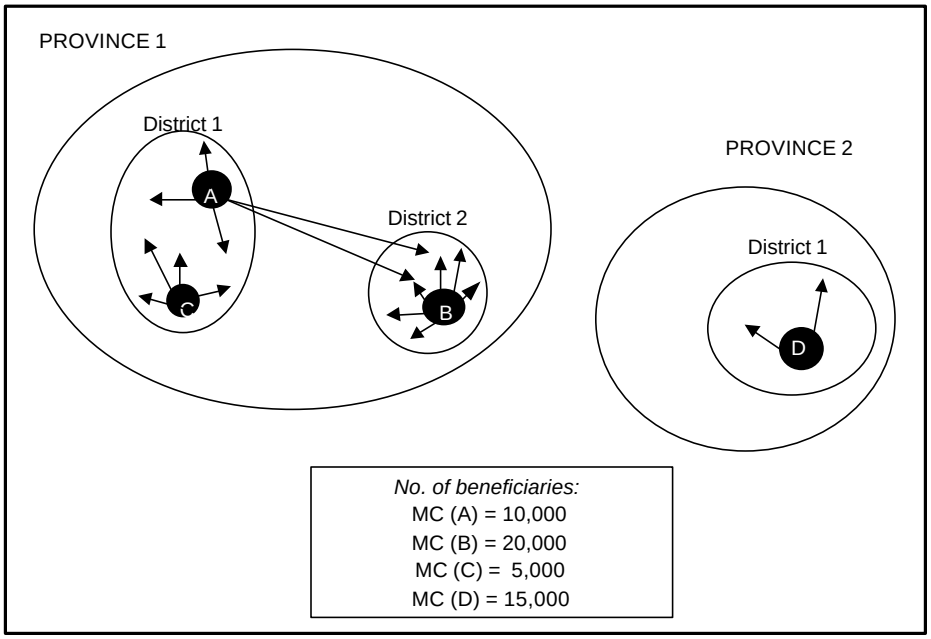
Calculating HI at the province level (HI_P)

A hypothetical situation with two provinces is used here to explain the calculation of HI_P diagrammatically. In the example below there are two provinces. Province 1 consists of three MCs and Province 2 consists of one MC. Box 1 describes how the HI_P is calculated using the example in Figure 4.

Box 1: Calculation of the Province-level HI (HI_P)

Total no. beneficiaries in Province 1	= 35,000
MC(A)'s share of beneficiaries in Province 1	= 10,000 / 35,000
MC(B)'s share of beneficiaries in Province 1	= 20,000 / 35,000
MC(C)'s share of beneficiaries in Province 1	= 5,000 / 35,000
HI_P for Province 1	**$= (10{,}000 / 35{,}000)^2 + (20{,}000 / 35{,}000)^2 + (5{,}000 / 35{,}000)^2 = 0.43$**
Total no. beneficiaries in Province 2	= 15,000
MC(D)'s share of beneficiaries in Province 2	= 15,000 / 15,000
HI_P for Province 2	**$= (15{,}000/15{,}000)^2 = 1$**

Figure 4: Calculating HI at the Province Level (HI_P)

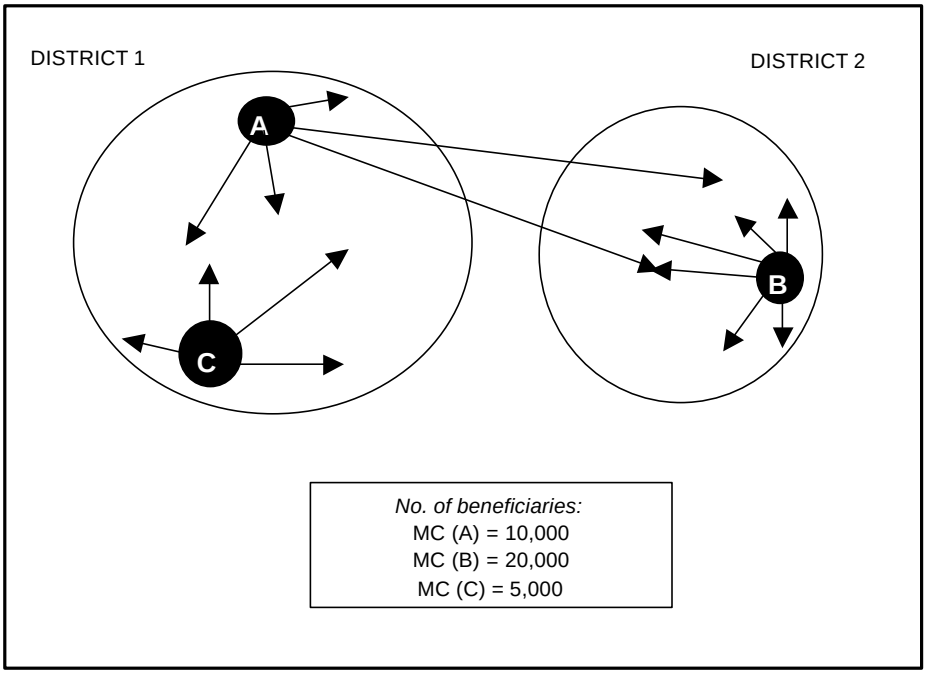


The share of private beneficiaries in each province was calculated as the proportion of beneficiaries in each province that are enrolled with private MC's.

Calculating HI at the district level (HI_D1 and HI_D2)

Calculation of HI at the district level presents a challenge because MC hospitals sometimes contract with providers outside of their district, as depicted in Figure 5. District 1 includes MC(A) and MC(C). MC(A) has five subcontractors, two of which are in District 2. MC(C) has four subcontractors, all of which are in its own district. MC(B) has six subcontractors, all of which are in its own district.

Figure 5: Calculating HI at the District Level (HI_D1 and HI_D2)



1. HI_D1

The first method is based on the location of the MC itself. Box 2 describes how HI is calculated using the first method for the districts shown in Figure 5. In calculating the share of beneficiaries, all of the beneficiaries of each MC are treated as being the same district as the MC itself. So, even though MC(A) has two subcontractors in District 2, they are accounted for under District 1.

Box 2: Calculation of the District-level HI using MC Beneficiaries

Total no. of beneficiaries in District 1	= 10,000 + 5,000 = 15,000
MC (A)'s share of beneficiaries	= 10,000 / 15,000
MC (C)'s share of beneficiaries	= 5,000 / 15,000
HI_D1 for District 1	**= (10,000 / 15,000)^2 + (5,000 / 15,000)^2** **= 0.56**
MC (B)'s share of beneficiaries in District 2	= 20,000 / 20,000
HI_D1 for District 2	**= (20,000 / 20,000)^2** **= 1**

2. H1_D2

The second method is based on the location of the subcontractors. Data on beneficiaries were only available at the level of the MCs. It was assumed that beneficiaries were equally distributed between the MC and the subcontractors in each network. For instance, MC(A) has a total of 10,000 beneficiaries, of which we assume that four-sixths come from District 1 and two-sixths come from District 2. Box 3 below shows how HI is calculated using this second method for the districts in Figure 5.

Box 3: Calculation of the District-level HI using Subcontractor Beneficiaries

Share of MC(A)'s beneficiaries in District 1	= (10,000 / 6) x 4
	= 6667
Share of MC(C)'s beneficiaries in District 1	= 5,000
Total number of beneficiaries in District 1	= 5,000 + 6667
	= 11,667
HI_D2 for District 1	**= (6667 / 11,667)^2 + (5,000 / 11667)^2**
	= 0.51
Share of MC(A)'s beneficiaries in District 2	= (10,000 / 6) x 2
	= 3,333
Share of MC(B)'s beneficiaries in District 2	= 20,000
Total number of beneficiaries in District 2	= 23,333
HI_D2 for District 2	**= (3,333 / 23,333)^2 + (20,000 / 23,333)^2**
	= 0.76

Both of these methods are imperfect. Ideally, one would like to have utilization data at the subcontractor level, and/or information on the location of residence of beneficiaries. Then, one could calculate the market share each MC has based on actual utilization, or based on enrollment with the MC as a share of total potential enrollment based on SSS beneficiaries' residence location. Using the example depicted in Figure 5, HI-D1 over-estimates the market concentration in District 2. It would appear that MC(B) captures the entire SSS market in District 2 when, in fact, it is competing with MC(A), which has extended its network to District 2 through subcontracting. HI_D2 also involves some measurement error. Suppose half of the SSS beneficiaries in District 2 are enrolled with MC(A) while half are with MC(B). In this case, HI_D2 over-estimates the actual market concentration. The opposite situation can also occur, in which case HI_D2 under-estimates market concentration.

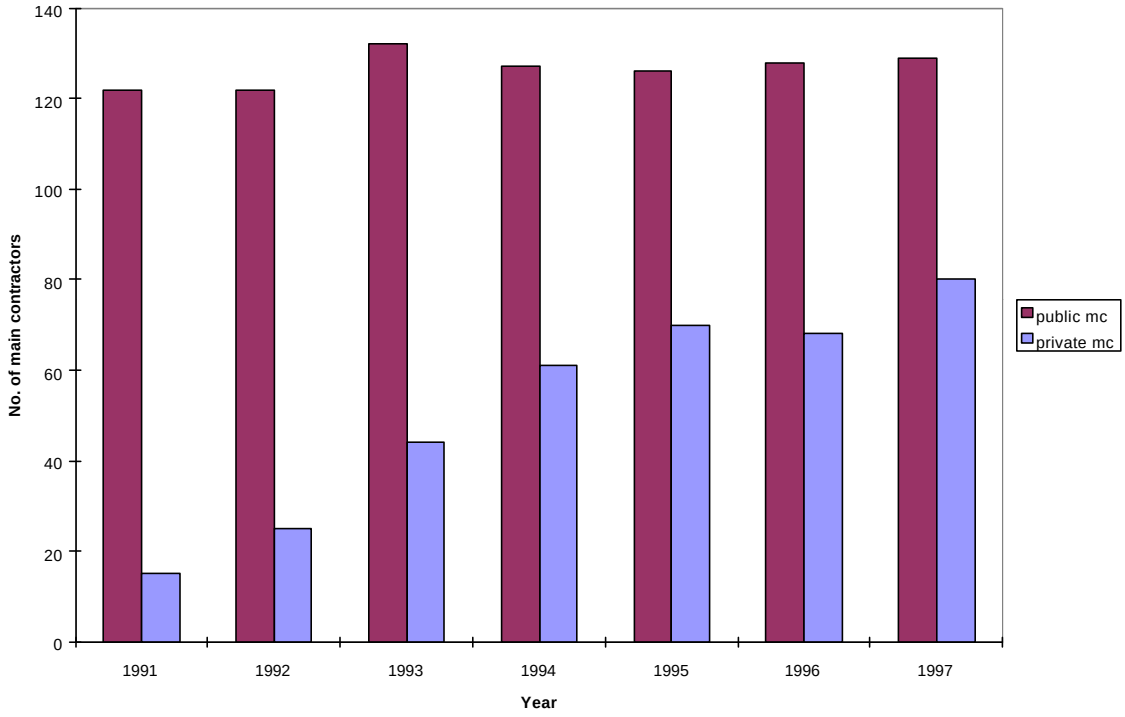
4.2.2 Data

Data on contracting were obtained from the SSO for the period 1992-98. They included data on the number of main contractors and, for each MC, the number of beneficiaries enrolled, whether the MC was public or private, its location, and the number of subcontractors. Data were also available on each subcontractor's location and whether it was public or private.

4.2.3 Findings

Since the introduction of the scheme, the total number of MC hospitals has increased tremendously (Figure 6), notably in the private sector.

Figure 6: Public and Private Main Contractors



Main contractors expanded their geographical coverage by subcontracting with other hospitals. Although some MC hospitals were the sole providers in their networks, proportionally more MCs had subcontractors in 1998 than in 1992 (Table 14).

Table 14: Number of Public and Private Contractor Networks of the SSS

Year	Public networks			Total	Private networks			Total
	Do not have subcontractors	Have subcontractors			Do not have subcontractors	Have subcontractors		
1992	45	74	62%	119	10	7	41%	17
1993	26	96	79%	122	16	9	36%	25
1994	29	105	78%	134	14	29	66%	44
1995	19	107	85%	127	29	30	55%	64
1996	21	105	83%	126	24	43	64%	67
1997	15	107	88%	122	20	44	69%	64
1998	18	109	86%	127	27	51	66%	79

Source: Social Security Office

In addition, there has been a sizeable growth in the number of mixed networks. A mixed network is one with both public and private providers. Table 15 shows the number of public, private, and mixed networks between 1991 and 1997.

Table 15: Number of Public, Private, and Mixed Networks (1991–97)

	1991	1992	1993	1994	1995	1996	1997
Public	120	121	118	104	95	94	92
Private	15	24	44	61	70	68	80
Mixed	2	2	14	23	31	34	37
Total	137	147	176	188	196	196	209

As expected, the number of subcontractors per MC increased over time. In both public and private networks, the number of providers without subcontractors decreased whereas the number of main contractors with more than 20 subcontractors increased (Table 16).

Table 16: Number of Subcontractors in the MC Networks of the SSS

No. of subcontractors	Public network			Private network		
	1992	1995	1998	1992	1995	1998
0	45 38%	17 13%	18 14%	10 56%	29 46%	27 34%
1 – 5	23 20%	24 19%	22 17%	4 22%	10 16%	12 15%
6 – 10	28 24%	44 35%	43 34%	1 6%	8 13%	8 10%
11 – 20	17 15%	31 24%	29 23%	1 6%	6 10%	17 22%
> 20	4 3%	11 9%	15 12%	2 11%	11 16%	15 19%
Total	117 100%	127 100%	127 100%	18 100%	64 100%	79 100%

Source: Social Security Office

In their drive to expand their geographic coverage of markets, MCs increasingly subcontracted to providers outside their own districts over time. While public MCs were more likely than private MCs to contract outside their district, the increase in subcontracting activities between 1992 and 1998 has been more rapid for private MCs (Table 17). The relatively high rate of public hospitals subcontracting outside their districts in the initial years may reflect MOPH's requirement for general and regional hospitals to subcontract community hospitals outside their districts in the same province.

Table 17: Percentage of MCs with Subcontracts Outside Their Own Province and/or District

MC	1992	1998
Public	64%	83%
Private	29%	64%

As the number of subcontracts per network increased, the number of beneficiaries per networks followed a different pattern. The beneficiary size of public networks barely changed between 1991 and 1997. The beneficiary size of private networks grew phenomenally at the first onset of the SSS in 1991-92, decreased between 1993 and 1995 and increased thereafter, but without regaining its original peak. Interestingly, the beneficiary size of mixed networks fell sharply between 1991-93 (Figure 7). While public networks held just under 90 percent of the share of beneficiaries in 1991, nearly 40 percent of that had been lost to private and mixed networks by 1997 (Figure 8).

Figure 7: Average Size of Networks Based on the Number of Beneficiaries

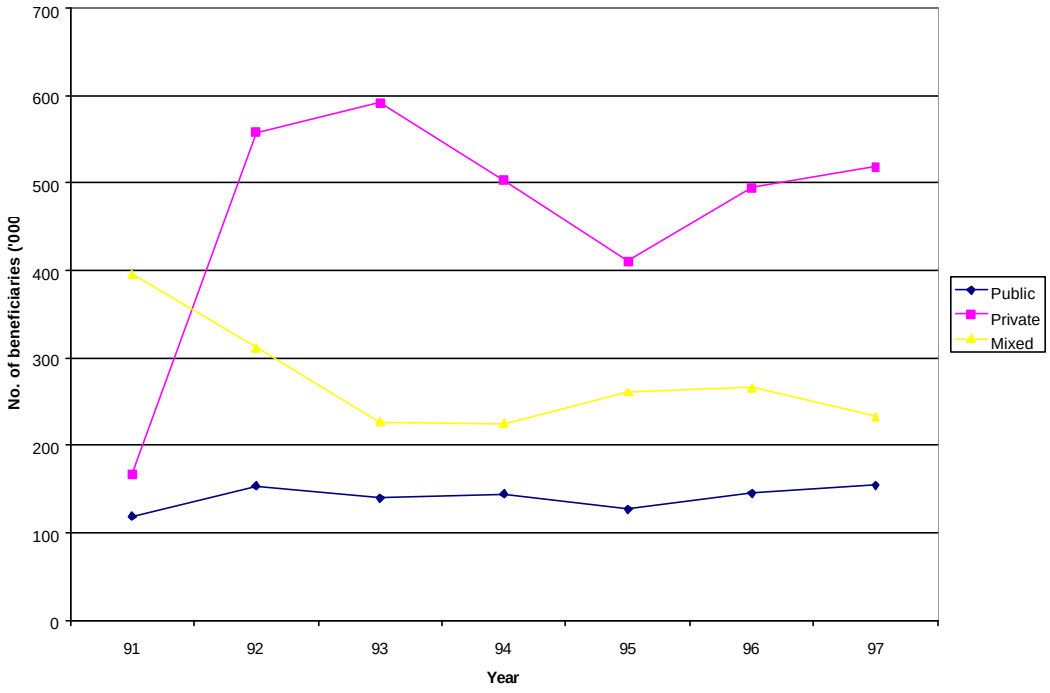
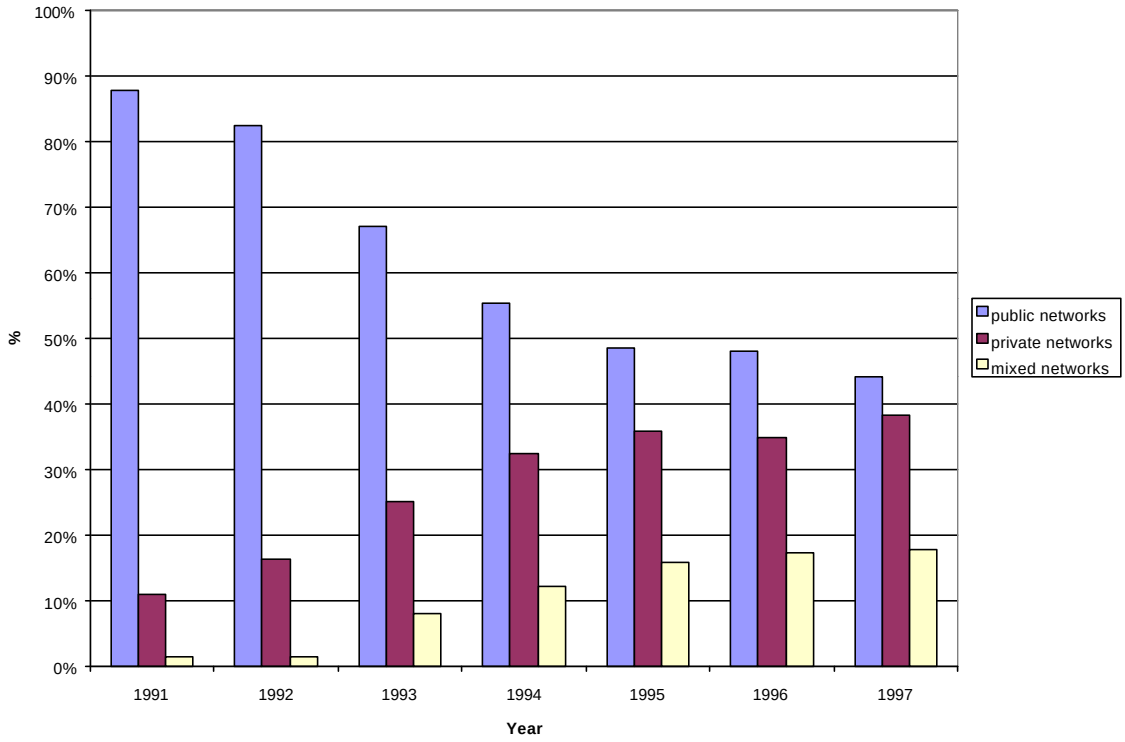
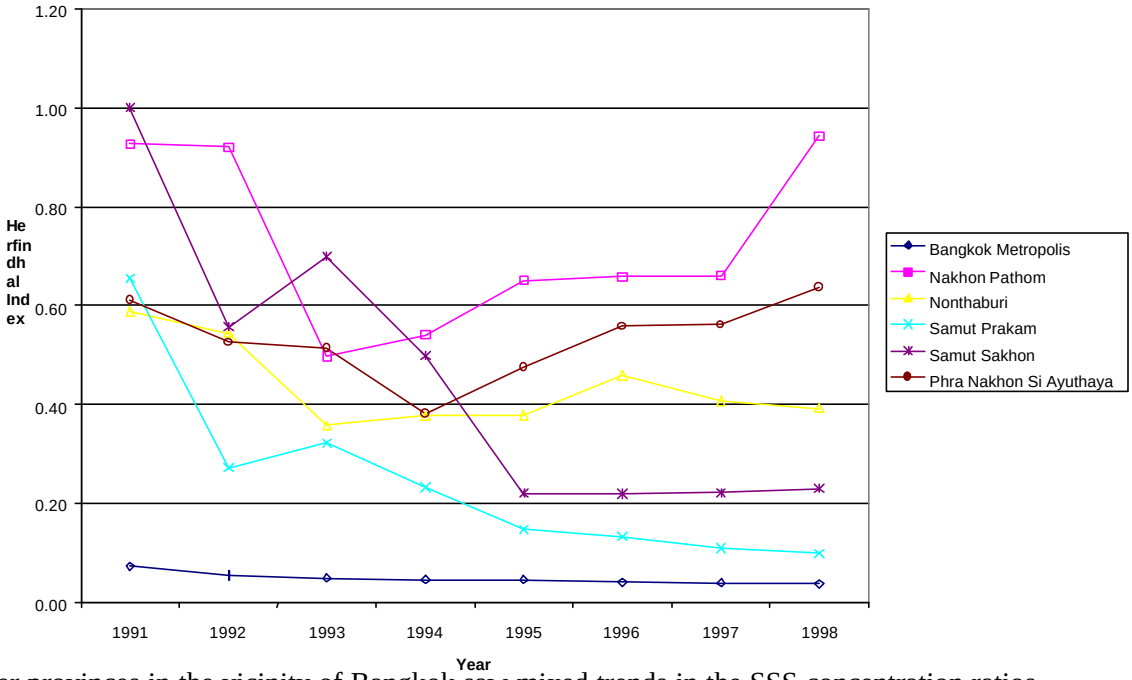


Figure 8: Share of Beneficiaries in Public, Private, and Mixed Networks, 1991-97



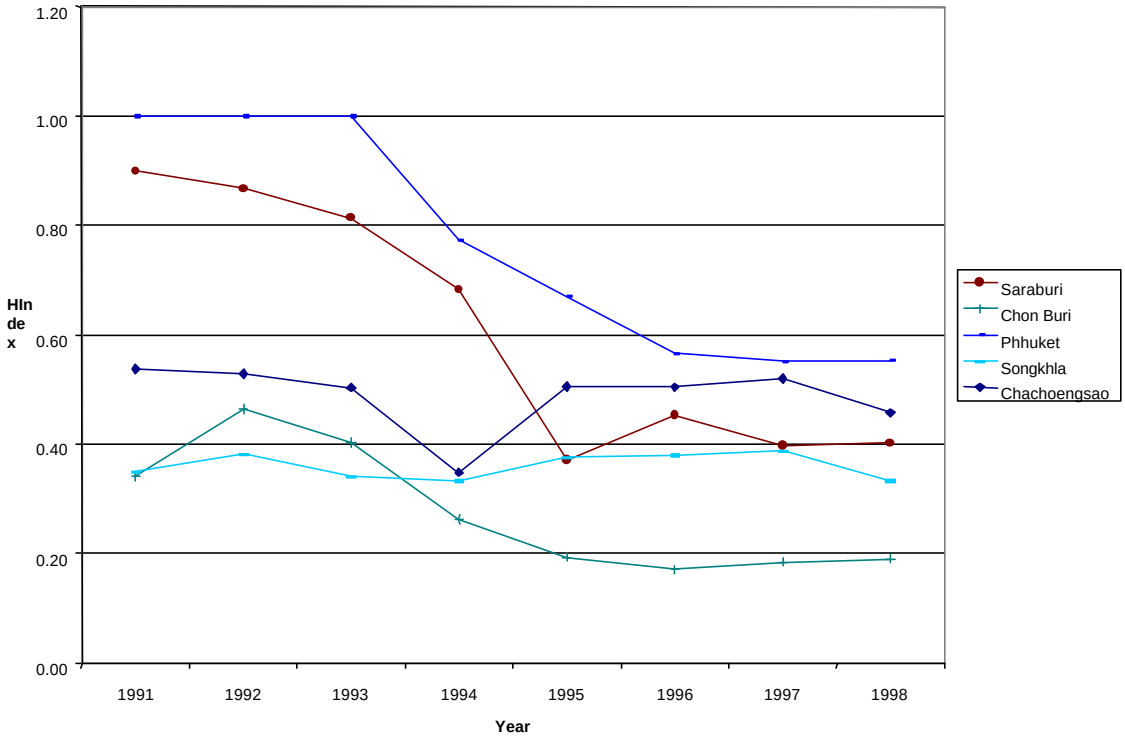
To understand the implications of the above changes for SSS market structure, researchers examine the trends in market concentration over time. Concentration ratios at the province level (HI_P) were analyzed separately for Bangkok/vicinity and the rest of the country, since the former saw much larger and faster rates of growth of networks. Bangkok metropolis itself has a very low concentration ratio, a feature that can probably be attributed to the sheer large number of providers in the province (Figure 9). Except for a fall in concentration in 1991-92 associated with the inception of the SSS, there was very little change in the concentration of the SSS market in Bangkok metropolis.

Figure 9: HI_P for Provinces in Bangkok and Vicinity



Other provinces in the vicinity of Bangkok saw mixed trends in the SSS concentration ratios. Although the evidence was also mixed in provinces outside the Bangkok area, there was a clearer downward trend in the concentration ratios. Figure 10 shows the trend of HI_P for the five provinces with the largest share of SSS beneficiaries in the country. (HI_P for the entire country is presented in Annex A).

Figure 10: HI_P for Five Provinces with the Largest Share of SSS Beneficiaries in the Country



Annex A presents trends in SSS HI at the district levels for Bangkok and vicinity because this area is highly competitive, with a high percentage of subcontractors and beneficiaries relative to other areas in the country. Districts where HI_D1 is missing but not for H1_D2 imply that there are no MCs in the district, but only subcontractors. As can be seen in Annex A, HI_D2 is a much more sensitive measure than HI_D1. However, there is no distinctive pattern of either HI measure over time.

With regard to private share, all provinces saw significant growth between 1991-97, with the exception of Chon Buri and Samut Sakhon (Tables 18 and 19). The high growth rate of private shares in Bangkok and vicinity and in some provinces shown in Tables 18 and 19 might be attributed to increase in number of private hospitals in the expanding industrial areas and their interests in joining the SSS. Private MCs successfully attracted more beneficiaries than their over-crowded public MC counterparts.

Table 18: Trends in Private Share of MCs in Bangkok and Vicinity (percent)

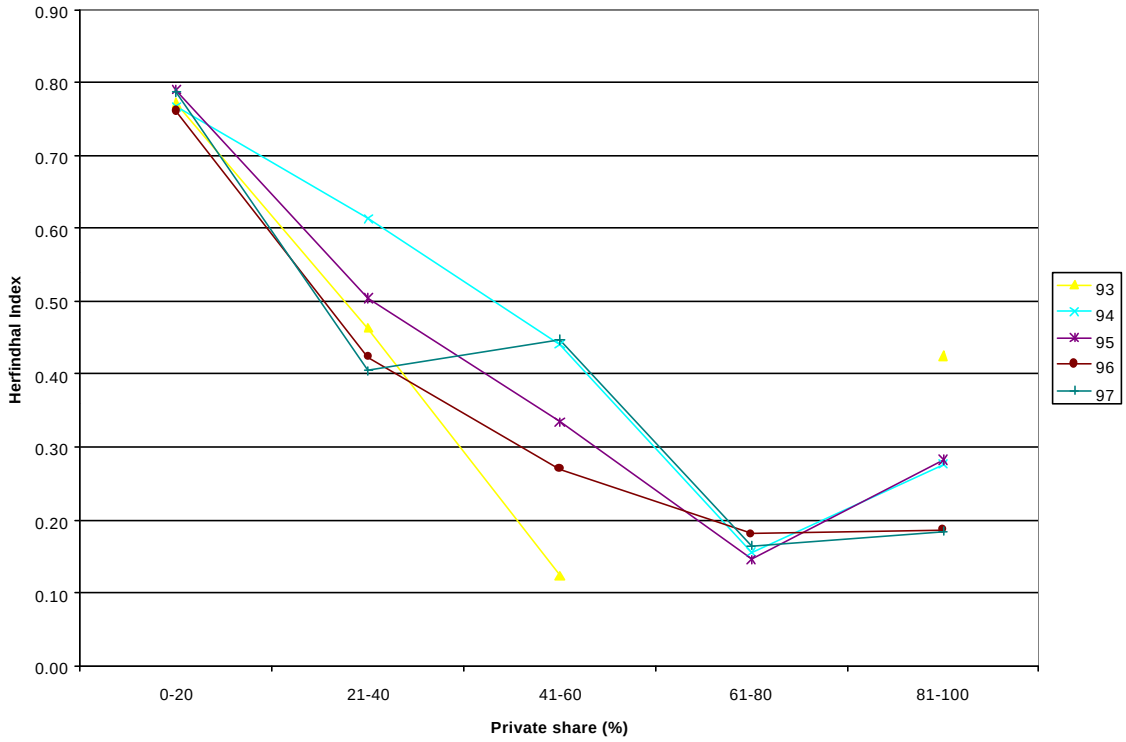
	1991	1992	1993	1994	1995	1996	1997
Bangkok Metropolis	8	33	52	64	64	67	70
Nakhon Pathom	0	0	43	66	96	79	80
Nonthaburi	0	0	33	61	73	79	79
Samut Prakam	0	82	96	91	97	96	97
Samut Sakhon	0	67	82	52	71	75	72
Phra Nakhon Si Ayuthaya	0	0	0	51	64	72	80

Table 19: Trends in Private Share of MCs in Other Provinces (percent)

	1991	1992	1993	1994	1995	1996	1997
Saraburi	0	0	0	0	0	19	28
Chachoengsao	0	0	0	100	100	100	100
Chon Buri	26	72	84	77	61	55	72
Phhuket	0	0	0	0	0	32	34
Lamphun	0	0	0	0	44	66	74

Private shares were evidently negatively associated with concentration. This pattern holds true for every year during the period 1993-97 when private MCs and their networks grew in dominance. (Figure 11).

Figure 11: Private share and market concentration



4.3 Relationship between Market Concentration and Cost of Service

4.3.1 Methods

Researchers employed regression analysis to examine the association between market concentration and hospital costs, first analyzing total costs per day and length of stay per admission, and then two specific components of costs, drug and lab tests. Log-linear models were used for total costs per day, LOS, and drug costs per day. Since close to 20 percent of the admissions had no lab test expenses, researchers analyzed the probability of prescribing lab test, then conditioning on having a prescription, they analyzed the cost of services. The unit of observation is a hospital admission. However, since market structure affects market conduct, which in turn affects market structure, the interpretation of the results is associative, rather than causal[1].

The key explanatory variable was market concentration, which was measured using the Herfindhal Index, as commonly used in the economics literature. Instead of the HI_{sss} level as an independent variable, researchers used the average rate of change in HI_{sss} (DHI_{sss}) between 1992 and 1997 for two reasons: 1) average change over a six-year period is less sensitive to cross-sectional differences in a single year that may be a result of random shock, and 2) theoretically, market power

[1] To account for the reverse causality would require estimation of a simultaneous equation model, which is beyond this study due to data limitation.

is more accurately measured by the ability of firms to maintain their power over time[2]. DHI_{sss} measures changes in the competitiveness of the SSS market structure, assuming equal impact of public and private sector penetration. Since private sector participation is a key feature of the SSS design, researchers separated its independent effect by including the change in private share as an independent variable (*DPrivsh*), where private share is measured as the share of SSS beneficiaries enrolled with private MCs. They also controlled for the "general" competitiveness of the market by constructing an HI based on the share of beds of all hospitals in the province, regardless of whether the hospital was an SSS MC or not ($HI_{non\text{-}sss}$)[3]. Omitting $HI_{non\text{-}sss}$ will bias the estimates for HI_{sss} if there is any spillover effect of non-SSS specific competition on treatment patterns for SSS patients. To test for differential associations between DHI_{sss} and costs as private share penetration varies, researchers also included an interaction variable between DHI_{sss} and *DPrivsh* in some specifications. ICU costs were included to control for severity amongst patients. The full list of variables, their definitions and summary statistics are listed in Table 20.

Table 20: Definitions of Model Variables

Dependent variables		**Mean (std dev)**
Lntot	Log(Total costs per admission)	2584 (2199)
Lndrg	Log (Drug costs per admission)	1001 (859.7)
Lnlab	Log(Lab costs per admission)	250.3 (261.4)
Lnlos	Log (Length of stay)	2.468 (2.576)
Explanatory variables		
ΔHI_{sss}	Average rate of change of HI between 1992 and 1997	-0.082 (0.061)
$HI_{non\text{-}sss}$	HI based on bed share at province level in 1998	0.274 (0.252)
Prish	Proportion of beneficiaries enrolled in private MC's in the province in 1997	0.610 (0.339)
Doc	Doctors per 1000 population in 1998 in the province	0.452 (0.352)
Age	Age of patient	31.03 (10.53)
ICUC	Intensive care unit costs per admission	41.57 (598.5)
Pci98	Per capita income of province in 1998	225181 (96765)
Female	Dummy variable for female patient	0.634 (0.482)
Gastro	Dummy variable for gastroenteritis	0.689 (0.463)
Myoma	Dummy variable for leiomyoma of uterus	0.061 (0.239)
Pneu	Dummy variable for Pneumonia	0.077 (0.266)
Appen	Dummy variable for Appendicitis	0.082 (0.275)
Pyelo	Dummy variable for Pyelonephritis	0.091 (0.287)
Pubhosp	Dummy variable for public hospital	0.351 (0.477)

[2] The financial crisis in Thailand began in December 1997. To minimize the sensitivity of HI to the financial crisis, the study excludes HI for 1998 in the calculation of its change.
[3] The study did not have the data needed to calculate changes in $HI_{non\text{-}sss.}$

4.3.2 Data

The SSO claims records on hospitalizations in 1998 were the main source of data. The SSO requires MCs to send claim data to the SSO for statistical purposes. The SSO uses the data to re-calculate the capitation payment, if there is a request for raising the rate. The SSO pays MCs Baht 30 per head to give them incentives to file the claims. Each record contained data on diagnosis (up to three types) and procedure (up to four types) codes, age, and gender of the patient, hospital to which the patient was admitted, length of stay, total charge and charges for procedures, x-ray, laboratory tests, drugs, intensive care unit, etc. Since the SSO keeps only one year's worth of data it was not possible to compare records over time. Moreover, the SSO does not keep records on outpatient visits. Data on HI-P, private share were merged based on the location of MC where the operation took place.

The additional data used to estimate the models were obtained from a variety of sources (Table 21).

Table 21: Health and Socioeconomic Data Sources

Variables	Sources
Per capita income (province)	Bank of Thailand
Population (province)	National Statistics Office
Number of physicians (province)	MOPH
Number of hospital and hospital beds, public and private (province)	MOPH

4.3.3 Findings

The regression sample consists of approximately 12,300 hospital admissions, 62 percent occurring in BKK; among them, 85 percent took place in private MCs. Annex B shows the correlation matrix of several market structure indicators in BKK. SSS-specific market concentration (HI_{sss}) for this sample fell at an average rate of 9.7 percent between 1992 and 1997. A greater reduction in HI_{sss} is correlated with a lower cross-sectional measure of HI_{sss} in 1997. Surprisingly, areas with greater reductions in HI_{sss} are correlated with higher non-SSS-specific market concentration ($HI_{non\text{-}sss}$). This may reflect that SSS providers are more likely to enter market areas with a few dominant hospitals in order to take advantage of their reputations and with whom they may contract for more specialized and complicated services. As expected, a greater reduction in HI_{sss} is correlated with a higher private share of the SSS in 1997, but contrary to expectation, a greater reduction in HI_{sss} is correlated with a slower private share growth.

Hospital admissions outside BKK took place predominantly at public MCs, with 25 percent of admissions occurring at private MCs. HI_{sss} fell at an average rate of 6.1 percent per year over 1992 and 1997. As was in BKK, a greater reduction in HI_{sss} was correlated with a lower cross-section HI_{sss} in 1997, but the correlation was much stronger than compared to that in BKK. In contrast to BKK, a reduction in HI_{sss} is associated with lower $HI_{non\text{-}sss}$ 1998, implying that SSS and non-SSS market concentrations are moving in the same direction. While a more negative DHI_{sss} is highly correlated with higher private shares, which is similar to BKK, its association with changes in private share is rather weak (see Annex B).

Tables 22 and 23 present the regression results for BKK and outside BKK, respectively. The first columns under each dependent variable show the specification without including the interaction

between DHI_{sss} and *DPrivsh* while the second columns include them. The report first discusses the first columns.

***DHI_{sss}* and Pub*DHI_{sss}**: In BKK, after controlling for differences in private sector growth, a faster reduction in SSS market concentration (DHI_{sss}), or greater increase in the competitiveness of the SSS market structure, is significantly associated with higher total, drug, and conditional lab costs per day in private hospitals. Although there is an indication that a lower DHI_{sss} is associated with an increased probability of prescribing lab tests, the result is not significant and there is no observable association between DHI_{sss} and LOS. For public hospitals[4], similar to private hospitals, a more negative DHI_{sss} is significantly associated with higher total and drug costs. However, in contrast to private hospitals, public hospitals significantly reduced the probability of prescribing lab tests and LOS in areas with increased competitive SSS market structure. Although the coefficient estimate for Pub*DHI_{sss} is not significant, it is interesting to note that its magnitude is almost equal to DHI_{sss} but opposite in sign, suggesting a zero net effect. Outside BKK, the association between DHI_{sss} and the intensity of resource use is much weaker, in magnitude and statistical significance.

DPrivsh and Pub*DPrivsh: In BKK, a faster growth in private share is significantly associated with greater costs of service, but not LOS. The results are similar for public and private hospitals, barring that the magnitude of increase in the use of lab tests is smaller for public hospitals. Outside BKK, private sector growth also had some moderate effects in increasing drug costs, but the main effect was on the probability of having lab tests.

[4] The coefficient estimates for the public hospitals is the sum of the coefficients for DHI_{sss} and Pub*DHI_{sss}

Table 22: Relationship between Cost of SSS and Market Concentration for Bangkok and Vicinity Provinces

	Total cost/day		Drug cost/day		Probability of lab		Conditional lab cost/day		LOS	
Pub*ΔHI_{sss}	-0.260	-2.394*	-0.119	-0.781	61.05***	38.78***	4.335	5.806	3.487**	0.595
	(1.250)	(1.008)	(0.190)	(1.412)	(8.827)	(7.075)	(4.392)	(3.550)	(1.548)	(1.247)
ΔHI_{sss}	-4.690***	-1.537***	-8.476***	-3.955***	-14.84	-11.448*	-4.516**	-1.117	0.420	0.790
	(0.569)	(0.330)	(0.798)	(0.462)	(8.370)	(5.164)	(1.629)	(0.916)	(0.705)	(0.409)
Pub*ΔHI_{sss} *ΔPrivsh		-0.004		0.040		0.958***		0.350***		-0.013
		(0.024)		(0.034)		(0.213)		(0.080)		(0.030)
ΔHI_{sss}*ΔPrivsh		-0.091***		-1.169***		-0.060		-0.110***		0.016
		(0.008)		(0.011)		(0.171)		(0.019)		(0.010)
Pub*ΔPrivsh	-0.002		-0.001		-0.078***		-0.015***		-0.003	
	(0.001)		(0.002)		(0.013)		(0.005)		(0.002)	
ΔPrivsh	0.727***		1.218***		1.395		0.818***		-0.037	
	(0.062)		(0.087)		(1.256)		(0.155)		(0.077)	
Pub*$HI_{non-sss}$	-1.355***	-1.693***	0.692	0.855*	-3.040	-4.987*	4.297***	4.574***	-0.966**	-1.427***
	(0.292)	(0.275)	(0.411)	(0.387)	(2.457)	(2.434)	(0.895)	(0.793)	(0.362)	(0.340)
$HI_{non-sss}$	-4.149***	-2.911***	-4.516***	-1.741***	16.58***	8.759**	-0.340	0.900	-0.272	-0.852*
	(0.344)	(0.305)	(0.483)	(0.434)	(4.305)	(3.145)	(1.046)	(0.950)	(0.426)	(0.382)
Pubhosp	-0.941***	-1.177***	-1.690***	-1.566***	-5.288***	3.165***	-0.491	-0.118	0.769***	0.446**
	(0.135)	(0.122)	(0.190)	(0.172)	(1.086)	(0.977)	(0.447)	(0.407)	(0.167)	(0.151)
N	7398	7398	7385	7385	7398	7398	7075	7075	7398	7398
R-square	0.636	0.636	0.470	0.469	0.428	0.413	0.089	0.088	0.417	0.416

Note: *** indicates p-value<0.005, ** indicates p-value<0.01, * indicated p-value<0.05. All variables in Annex C were included but not reported here.

Table 23: Relationship between Cost of SSS and Market Concentration outside Bangkok and Vicinity Provinces

	Total cost/day		Drug cost/day		Probability of lab		Conditional lab cost/day		LOS	
Pub*DHI$_{sss}$	0.705	0.631	-0.139	-0.887	2.554	-8.446	0.677	1.299	0.813	0.445
	(0.479)	(0.441)	(0.594)	(0.545)	(5.686)	(10.454)	(0.857)	(0.786)	(0.484)	(0.446)
DHI$_{sss}$	0.025	-0.092	0.221	0.547	-1.933	4.218	0.159	0.835	-0.384	-0.419
	(0.452)	(0.409)	(0.561)	(0.506)	(5.648)	(10.453)	(0.797)	(0.712)	(0.457)	(0.414)
Pub*DHI$_{sss}$ *DPrivsh		-0.068***		-0.016		-0.030		-0.118***		0.012
		(0.017)		(0.208)		(0.291)		(0.031)		(0.017)
DHI$_{sss}$*DPrivsh		0.071***		0.029		0.322		0.024		0.007
		(0.015)		(0.018)		(0.289)		(0.026)		(0.015)
Pub*DPrivsh	-0.000		-0.000		-0.036*		-0.003		0.001	
	(0.001)		(0.001)		(0.014)		(0.002)		(0.001)	
DPrivsh	0.108		0.158*		3.554*		0.190		0.017	
	(0.063)		(0.078)		(1.430)		(0.112)		(0.064)	
Pub*HI$_{non-sss}$	0.039	-0.358	0.109	-0.000	15.56***	11.891**	1.830***	0.543	-0.764**	-0.568**
	(0.281)	(0.267)	(0.345)	(0.296)	(3.969)	(4.446)	(0.517)	(0.485)	(0.284)	(0.271)
HI$_{non-sss}$	-1.146***	-0.673*	-1.312***	-0.971**	-19.10***	-13.55***	-2.823***	-2.189***	0.808***	0.811***
	(0.258)	(0.239)	(0.317)	(0.295)	(3.948)	(4.424)	(0.467)	(0.425)	(0.261)	(0.242)
Pubhosp	-1.316***	-1.284***	-1.225***	-1.279***	-8.007***	-8.564***	-1.089***	-0.946***	0.347***	0.303***
	(0.087)	(0.088)	(0.107)	(0.108)	(1.433)	(1.729)	(0.157)	(0.157)	(0.088)	(0.089)
N	4678	4678	4652	4652	4680	4680	3387	3387	4680	4680
R-square	0.624	0.631	0.451	0.455	0.184	0.1974	0.174	0.177	0.367	0.367

Note: ***represents p-value<0.005, ** indicates p-value<0.01, * indicated p-value<0.05. All variables in Annex C were included but not reported here.

Interactions between DHI_{sss} and DPrivsh: In the second columns where interactions between DHI_{sss} and *DPrivsh* are included, the results need to be interpreted with caution because there was high collinearity among DHI_{sss} *DPrivsh* and DHI_{sss} * *DPrivsh*; *DPrivsh* had to be dropped in order to test for the interaction effects. Consequently, the coefficients for the interaction variables could be biased. With this caveat in mind, results showed that greater private sector growth reinforces the main results described earlier. For example, comparing areas with low- to high-private sector growth, the negative association between total costs per day and DHI_{sss} is stronger in areas with higher private sector growth. These results may suggest that private sector participation is an important driving force for competition in the Thailand MC hospital market. Since the correlation between DHI_{sss} and *DPrivsh* is in the opposite direction from expectation, researchers did a sensitivity analysis by replacing *DPrivsh* with the cross-section measure of *Privsh*. The results were very similar (see Annex D) in that the negative association between costs of services and DHI_{sss} was stronger in areas with higher private share, in both BKK and outside BKK. There is albeit one difference. For private hospitals in BKK, a reduction in SSS concentration is associated with lower total and drug costs (see coefficients for DHI_{sss}); however, the reduction in costs was moderated as private share increased (see coefficients for DHI_{sss} * *DPrivsh*).

$HI_{non\text{-}sss}$ and Pub* $HI_{non\text{-}sss}$: In BKK, the resource intensity of treatment for SSS patients is significantly related to the non-SSS-specific market structure, suggesting a spillover effect. A lower HInon-sss is significantly associated with higher total and drug cost per day and longer LOS for SSS admissions in both public and private hospitals. However, both types of hospitals are less likely to incur lab test costs in areas with a more competitive non-SSS market structure.

Outside BKK, lower non-SSS market concentration is also associated with higher costs for SSS admissions in both public and private hospitals. In addition, private hospitals are more likely to increase the probability of lab tests in areas with lower $HI_{non\text{-}sss}$ (in contrast to BKK). Similar patterns were observed for public hospitals, but with a smaller magnitude. In areas with more competitive non-SSS market structure, length of stay is also shorter for both public and private hospitals, but again, the magnitude of change is smaller for public hospitals.

In summary, the increased competitiveness in the SSS market structure, measured as concentration ratio or private sector growth, is in general associated with higher costs of treatment, for public and private hospitals. These results suggest that MCs compete by quality. However, the effects are only detected in BKK. Second, regardless of whether private sector participation is measured in growth or in cross-sectional terms, the results show that greater private sector participation reinforced the positive association between competitive market structure and cost of service. Third, non-SSS market structure has a very significant impact on the practice pattern for SSS patients, inside and outside of BKK. In general, areas with lower non-SSS specific market concentration are associated with greater costs of treatment for SSS patients. Finally, public and private hospitals seem to differ most in their use of lab tests. Private hospitals exhibit lower lab costs in BKK, but higher lab costs outside BKK, in association with a lower $HI_{non\text{-}sss}$. These results may be due to private hospitals facing price competition in the non-SSS sector of BKK and therefore have to be more discrete in using lab tests, attempting to save costs. Outside BKK, where public hospitals are the dominant providers, private hospitals compete by offering the latest technology. Public hospitals are also more discrete in using lab tests than private hospitals. In BKK, public hospitals incur lower lab costs in association with a greater reduction in SSS-specific market concentration and lower non-SSS market concentration. Outside BKK where public hospitals respond to a more competitive market structure by increasing lab tests, their magnitude of increase is smaller than the private hospitals.

4.4 Impact of Capitation Payment on Internal Organization and Management, and on Management of Contracts

4.4.1 Methods

In order to assess the impact of capitation payment on internal and subcontractor management of contractor hospitals, the following were also explored: applications of physician incentives, utilization review programs, quality assurance activities, as well as development of information and cost accounting systems to manage the social security services. The study also examined payment mechanisms, utilization review, and quality assurance that MC hospitals might apply to their network subcontractors.

4.4.2 Data

A cross-sectional interview survey using semi-structured interview questionnaires was conducted in the second half of 1999. A copy of the survey instrument is included in Annex C. Questions on hospital internal management and network management referred mainly to what happened and were applied by the hospitals in 1998, or before, in order to minimize any effects of the differences in the interview timing.

Management representatives who took the responsibility of managing SSS at each MC hospital were contacted. They were given interview question guidelines in advance of the interviews. Usually one interviewee was present at the interview session. In some hospitals, however, more than one responsible management person was present. Table 24 profiles the interviewees.

Table 24: Profiles of Interviewees

Hospital directors (no.)	4
Deputy directors responsible for social security services (no.)	6
Social security services managers, or equivalent, e.g., unit manager (no.)	2 (+3)
Average years in administrative positions (years)	6
Range (years)	2.5–12

4.4.3 Findings

A total of 12 MC's were included in the study. Of these, nine were public and three were private. The number of beneficiaries for each MC hospital varies by contractor type. A distribution of the number of beneficiaries by public and private contractor is provided in Table 25.

Table 25: Numbers of Registered Beneficiaries at Studied Hospital Contractor Networks in 1998

Number of registered beneficiaries	Public network (n =9)	Private network (n=3)
0–25,000	5	–
25,001–50,000	1	2
50,001–75,000	–	–
75,001–100,000	2	1
More than 100,000	1	–

Of the 12 MC hospitals, three did not have subcontractors. Those without subcontractors were all public hospitals. Some public hospitals belonging to the Ministry of Public Health may be part of a public provincial network of referral systems to rationalize the use of health services by the levels of care. But this kind of network was never formed as a result of a provider payment approach.

The next section presents findings of internal responses of MC hospitals as a result of capitation payment. Findings are presented under the following topics: internal management, physician payment, utilization review, quality management, and information and cost accounting approaches. The following section describes contractual arrangements observed between MC hospitals and their subcontractors, focusing on three areas: payment method, utilization review, and quality assessment.

A. MC Hospitals

1. Internal management

In order to accommodate the SSS with a different payment mechanism from the usual FFS and charge-based payments, there were changes in internal management of the MC hospitals. Five of the public MC hospitals and one of the private MC hospitals set up new units or departments to manage the SSS. Additionally, seven public MC's and one private MC created new administrative positions. In some hospitals, SSS committees were formed. A number of new responsibilities were assigned to these management bodies, including general management of services for the SSS beneficiaries, marketing, service statistics monitoring and utilization review activities, and quality assurance activities.

Furthermore, four of the nine public hospitals and two of the three private hospitals reported changes in the mix of physicians hired by the hospitals. These hospitals tended to hire more general practitioners and fewer specialists. However, they did not necessarily assign particular physicians to take care of social security patients, and did not always have the new physicians act as gatekeepers in the SSS. Eight of the 12 hospitals used different payment approaches for physicians providing care to SSS patients from those providing care exclusively to non-SSS patients (see Table 26).

Table 26: Internal Management of MC Hospitals

Features of internal management	Public network (n =9)	Private network (n=3)
Set up a new unit or department for managing social security services	5	1
New administrative positions for SSS	7	1
Change in medical specialty mixes	4	2
Special assignment of physicians and gatekeeper	2	1
Different payment arrangement for physicians	5	3

2. Physician payments

MC hospitals might use more than one method of physician payment. Public hospitals usually pay their physicians by salary, whereas private hospitals pay their physicians using FFS. Among five public hospitals that applied different physician payment arrangements for their SSS and non-SSS patients, one used capitation and four used FFS. In addition, three hospitals used bonus payments.

In contrast, two private hospitals paid the physicians by capitation for SSS patients, while they did not use the method to pay for non-SSS patients. However, they still paid SSS physicians by FFS for particular services. The other private hospital paid SSS physicians a fixed amount of payment per outpatient visit. A bonus payment was reportedly used in one of the private hospitals (see Table 27).

Table 27: Physician Payment Methods used by Contractors

Physician payment	Ownership (number of hospitals in parentheses)	Hospitals that pay physicians the same between SSS and non-SSS patients (n=5)	Hospitals that pay physicians differently (n=7)	
			For SSS patients	For non-SSS patients
Salary	Public (9)	4 out of 5	5 out of 7	5 out of 7
	Private (3)	0	1 out of 7	1 out of 7
Fee-for-services	Public (9)	0	4 out of 7	0 out of 7
	Private (3)	1 out of 5	1 out of 7	2 out of 7
Capitation	Public (9)	0	1 out of 7	0 out of 7
	Private (3)	0	2 out of 7	0 out of 7
Bonus payment	Public (9)	0	3 out of 7	2 out of 7
	Private (3)	0	1 out of 7	1 out of 7

Note: hospitals can have more than one type of payment arrangement for physicians.

3. Utilization review

Utilization review (UR) practices were important tools for hospitals. The techniques and extent of UR varied between MC hospitals. A number of hospitals applied UR similarly to SSS and non-SSS physicians, while others applied it only to physicians with SSS patients. In hospitals that applied UR

to both of the groups, the degree of intensity or modes of review differed. Unfortunately, not all hospitals participating in the study provided detailed information on the techniques used (see Table 28).

Use of an essential drug list was the most common UR practice used by both public and private hospitals. However, while public MCs applied the drug list to both SSS and non-SSS patients, private MCs applied it to SSS patients only. In addition, random checking of medical records, monitoring of medical mishaps, and patient complaints about physicians were used by both public and private MC hospitals. The latter group of techniques was generally applied to SSS and non-SSS physician services. Only public MC hospitals used practice guidelines and rules. None of the studied contractor hospitals allowed a gatekeeping system where general practitioners controlled cash.

Table 28: Policies Involving Monitoring of Physicians and Utilization Review Applied by the Hospitals

	Ownership (number of hospitals in parentheses)	Hospitals that did not distinguish between SSS and non-SSS physicians	Hospitals that distinguished physicians	
			For SSS physicians	For non-SSS physicians
Utilization review	Public (9)	7	1	-
	Private (3)	1	2	-
Pre-admission authorization	Public (5)	-	2	-
	Private (2)	-	2	-
Essential drug list	Public (5)	5	-	-
	Private (2)	-	2	-
Practice guideline / rules	Public (5)	3	-	-
	Private (2)	-	-	-
Random checking of medical records	Public (5)	3	1	-
	Private (2)	2	-	-
Monitoring number of medical mishaps	Public (5)	3	-	-
	Private (2)	2	-	-
Patient complaints about physicians	Public (5)	4	1	-
	Private (2)	-	2	-

Note: One private and four public hospitals responded that they applied the same utilization review approaches to both SSS and non-SSS physicians, but details on the activities were not provided.

4. Quality management

Hospitals in the study reported a number of quality assessment and management approaches used for the SSS. Most commonly, the hospitals monitored patients' complaints about overall hospital services, tracked the average length of stay, and studied readmission trends. Fulfilling ISO 9000 criteria was more common among public hospitals than among private hospitals. Of those included in the study, three public hospitals and one private hospital were in the process of fulfilling ISO 9000 criteria for accreditation (see Table 29)

Quality assessment was generally performed on a hospital-wide scale, rather than limited to social security services. However, some hospitals credit the use of quality assessment practices to the cost containment pressures and increased competition associated with the capitated reimbursement under the SSS.

Table 29: Quality Assessment and Management of Contractor Hospitals

Quality management approaches	Public network (n =9)	Private network (n=3)
Monitoring patient complaints about overall hospital services	8	3
Analyzing the mortality profile of the hospital	5	2
Studying the trend of the date of readmission	6	2
Monitoring the average length of stay	7	3
Fulfilling the Hospital Accreditation criteria	7	0
Fulfilling the ISO 9000 criteria	3	1

5. Information and cost accounting approaches

A majority of MC hospitals in the study created new information systems to accommodate the SSS. All three private MC hospitals had new information systems, while six of the nine public MCs created new information systems. Furthermore, all three private MCs and five public MCs set up local-area networks (LAN) to keep track of costs more accurately and to facilitate electronic patient billing with the SSO. In contrast, only a few public MC hospitals had effective cost accounting systems (see Table 30).

Table 30: Information and Cost Accounting Approaches

Approaches	Public network (n =9)	Private network (n=3)
Create a new information system to accommodate social security services	6	3
Set up a local area network to keep track of costs more accurately	5	3
Set up a local area network to maintain patients' medical records for quality monitoring	5	2
Set up a local area network to facilitate electronic patient billing	5	3
Set up a local area network to enable efficient resource management	3	2
Set up a local area network to provide expert systems for clinical decision-making	2	2
Cost accounting system is effective in allocating periodic production costs between goods and services sold and goods still in inventory	3	2
Cost accounting system is effective in providing feedback on resources consumed	2	2

Approaches	Public network (n =9)	Private network (n=3)
Cost accounting system is effective in determining costs of individual products	1	1
Cost accounting system is used to compare use of resources between sites	2	1
Cost accounting system is used to compare use of resources between treatment modality	1	1

B. Subcontractor Management

1. Subcontractor types and services

Of the nine public MC hospitals surveyed, six had subcontractors. In contrast, all of the private MC hospitals had subcontractors. Subcontractor networks of the public hospitals may include private physician clinics and polyclinics, public health centers, small public hospitals, and, sometimes, private hospitals. Subcontractor networks of the private MC hospitals generally consisted of private clinics and polyclinics only.

The public network subcontractors were commonly contracted to provide ambulatory consultation and emergency care. In three out of six public hospital networks, subcontractors were contracted to provide medical and surgical inpatient services, and two networks contracted their subcontractors to give obstetric care and ambulatory surgery. On the contrary, the private networks did not contract subcontractors to provide services beyond ambulatory consultation and emergency care. Over time, MCs contracted out a broader range of services (see Table 31).

Table 31: Type of Services Provided by MCs and Contracted Out to Subcontractors

Types of Services	Public network (n=9)				Private network (n=3)			
	1992		1998		1992		1998	
	OWN	OUT	OWN	OUT	OWN	OUT	OWN	OUT
Ambulatory consultation	8	2	9	6	3	0	3	3
Emergency	8	1	9	6	3	0	3	3
Medical inpatient	8	2	9	3	3	0	3	0
Surgical inpatient	8	2	9	3	3	0	3	0
Obstetrics								
Normal delivery	8	1	9	2	3	0	3	0
Cesarean section	8	1	9	2	3	0	3	0
Ambulatory surgery	8	1	9	2	3	0	3	2

2. Payment modes for subcontractor services

The payment methods used by MC hospitals to reimburse subcontractors for their services varied with the ownership of the MC hospital and the type of subcontractor—whether they were clinics and polyclinics, private hospitals, or public health facilities. The most common payment approach for private clinics and polyclinics was a fixed per-visit payment for an outpatient visit. Additional fee-for-service payments based on a fee schedule were occasionally used for certain procedures. Physicians were also occasionally paid by capitation. Some public MC hospitals (Hospitals 5, 10, 11, and 12) that had private hospitals in their networks paid their private-hospital subcontractors on a FFS basis, using preset fee schedules or a per-visit amount. This generally only covered outpatient visits, however. In contrast, public subcontractors—public health centers and small hospitals—were paid either by global budget, FFS, or per-visit payments. No hospital in the interview sample has a bonus or profit sharing payment to subcontractors (see Table 32).

Table 32: Approaches of Payment to Subcontractors by MC Hospitals

	For clinic/polyclinic subcontractors (Group A)	For private-hospital subcontractors (Group B)	For public hospital and health-center subcontractors (Group C)
Hospital 1	Capitation per visit	-	-
Hospital 3	-	-	global budget
Hospital 4	per visit fee schedule	-	-
Hospital 5	per visit	per visit	per-visit FFS
Hospital 7	per visit fee schedule	-	-
Hospital 8	per visit	-	FFS global budget
Hospital 10	per visit fee schedule	per visit FFS	per visit FFS
Hospital 11	per visit	FFS	-
Hospital 12	per visit fee schedule	FFS	FFS
Summary			
Public network	per visit FFS	Per visit FFS	global budget FFS per visit
Private network	capitation per visit FFS	-	-

Note: Hospitals 2, 6, and 9 had no subcontractors.

3. Utilization review on subcontractors

It was very common for MC hospitals to exercise utilization review on their subcontractors. UR was used more intensively for private clinics and polyclinics rather than for public health facilities. It should be noted that three of the four public MC hospitals with private hospital subcontractors (Hospital 4, 10, and 12) applied UR to their network subcontractors. The other public MC hospital (Hospital 11) did not. In contrast, all three private MC hospitals (Hospital 1, 4, and 7) applied UR to their subcontractors (Table 33).

Table 33: Approaches to Utilization Reviews on Subcontractors

	For clinic/polyclinic subcontractors	For private hospital subcontractors	For public hospital and health center subcontractors
Hospital 1	Yes	-	-
Hospital 3	No	-	-
Hospital 4	Yes	-	-
Hospital 5	Yes	Yes	Yes
Hospital 7	Yes	-	-
Hospital 8	Yes	-	Yes
Hospital 10	Yes	-	-
Hospital 11	No	No	No
Hospital 12	Yes	Yes	Yes
Summary			
Public network	**Yes = 4 No = 2**	Yes = 2 No = 1	Yes = 3 No = 1
Private network	Yes = 3 No = 0	Yes = 0 No = 0	Yes = 0 No = 0

There were variations in the extent to which UR activities were used to monitor subcontractors. The variation did not seem to relate to ownership status of MC hospitals, but rather to the number and type of subcontractors they had. Several UR activities were more frequently applied to private subcontractors than to public ones.

One MC hospital (Hospital 5) that had private hospitals as its subcontractors applied extensive UR activities to subcontractors. Review for these subcontractors included essential drug lists, pre-authorization for surgical procedures and diagnostic tests, pre-admission authorization, concurrent hospital review, retrospective hospital bill and record review, and a list of diseases with which patients must be transferred to get treatment at the MC hospital only. Some hospitals (Hospital 4, 7, and 8) applied claims statistics monitoring and retrospective chart review for unusual practice pattern.

Permission for referral was a common UR practice. Three public MC hospitals and two private MC hospitals reported using a group of experts to oversee and override decisions made by individual physicians. It was less common to require permission for diagnostic tests. It was very rare for MCs to require permission for experimental procedures. It might not be that the procedures were allowed, but it might be rather that they were uncommon in the social security setting (see Table 34).

UR activities were carried out manually. The use of a wide-area computer network for managing subcontractors under the scheme was not found at any MC.

Table 34: Application of Some Utilization Review Approaches

	Ownership	None	Required for clinics/ polyclinics	Required for private hospitals	Required for public hospitals and health center
Group of experts to oversee and override decision of individual doctors	Public (n=6)	3	3	2	1
	Private (n=3)	2	1	-	-
Permission for referral	Public (n=6)	1	4	2	2
	Private (n=3)	0	3	-	-
Permission for diagnostic tests	Public (n=6)	4	-	2	1
	Private (n=3)	2	1	-	-
Permission for experimental procedures	Public (n=6)	6	-	-	-
	Private (n=3)	2	1	-	-

4. Quality assessment applied to subcontractors

Random checking of medical records and monitoring of patient complaints were among the most common quality assessment approaches used with subcontractors. All but one public MC hospital reported using these methods. The use of other approaches varied by MC hospital (see Table 35).

Table 35: Quality Assurance Approaches Applied towards Subcontractors

	Ownership	None	Required for clinics/ polyclinics	Required for private hospitals	Required for public hospitals and health center
Random checking of medical records	Public (n=6)	1	4	4	2
	Private (n=3)	0	3	2	1
Requiring hospital accreditation	Public (n=6)	6	-	-	-
	Private (n=3)	3	-	-	-
Requiring attainment of ISO 9000	Public (n=6)	6	-	-	-
	Private (n=3)	3	-	-	-
Producing mortality profile of subcontractors	Public (n=6)	5	1	1	1
	Private (n=3)	2	1	-	-
Monitoring number of medical mishaps	Public (n=6)	5	1	1	1
	Private (n=3)	1	2	-	-
- Patient complaints	Public (n=6)	1	3	3	4
	Private (n=3)	0	3	-	-
- Set of documented practice protocols	Public (n=6)	3	1	1	2
	Private (n=3)	0	3	-	-
- Regular meetings with subcontractor	Public (n=6)	1	2	1	1
	Private (n=3)	0	3	-	-

In summary, MCs respond to capitation payment of the SSS by introducing alternative, and altering existing, internal management of the MCs, such as changing the mix of physician specialty, and setting up separate committees and departments for treating SSS patients. Physician payment methods that are aimed to increase physicians' productivity and quality of services are introduced in the public sector, whereas payment method that are aimed to having the physicians bearing a bigger share of the risk are introduced in the private sector. Similarly, utilization review, essential drug lists, and patient complaints monitoring are commonly found. Although these are often applied to both SSS

and non-SSS patients, some interviewees responded that competitive pressure exerted by the SSS was a major driving force behind introducing these measures.

Between MCs and their subcontractors, the payment methods used by MC hospitals to reimburse subcontractors for their services varied with the ownership of the MC hospitals and the types of subcontractors—whether they were clinics and polyclinics, private hospitals, or public health facilities. UR was commonly found, but it was used more intensively for private clinics and polyclinics rather than public health facilities. Permission for referral was a common UR practice. For quality assessment, random checking of medical records is the most commonly used approach. Interview profiles for each of the hospitals are in Annex E.

5. Conclusions

While many countries are contemplating incentive-based health sector reform, emphasizing competition and supply-side cost-sharing, the evidence on how they work and the extent to which they succeed in achieving the goals of cost containment, quality and efficiency improvement, etc. remains limited, especially for developing countries. This paper aims to partially fill this gap, focusing on how providers behave under the reform incentives. When deciding whether to adopt such reform strategies, it is important for policymakers to anticipate how providers will respond to the new incentives so they can design appropriate companion policies and regulations optimizing the benefits of the reform and reducing its negative impacts.

Thailand's health care system is similar to many low- and middle-income countries in that coverage by a public or social insurance scheme is far from universal. Although public hospitals and clinics provide subsidized to free care for the general population, quality is generally low and the providers are administratively constrained by public rules and bureaucratic red tape. In contrast, private providers offer better quality in terms of waiting time, choice of doctors, amenities, and are more flexible and innovative in their organization, but with higher fees. This study empirically assessed the experience of the SSS in Thailand to shed light on the potential impact of market-based reform in a developing country setting.

Findings show that SSS patients, in general, incur lower costs when compared to patients paid by FFS. Over time, there has also been a fall in market concentration as the number of MCs participating in the SSS increases and the size of the beneficiary enrollment at each MCs fall. The analysis shows that market concentration also falls as a result of increased subcontracting of MCs, which creates networks that overlap each other.

Results show that, over time, there is an increasingly competitive market structure for the SSS sectors, as measured by concentration ratio and private sector growth. This competitive market structure is associated with higher costs of service for both public and private hospitals, especially total and drug costs. One plausible interpretation of this finding is that MC hospitals compete by increasing quality. As predicted by Gravelle (1999), when consumers face zero costs at the point of service and capitation fees are regulated, providers compete by increasing quality, thus incurring higher costs. This interpretation is also corroborated by the hospital interviews, showing that hospitals adopt different measures of quality assurance and marketing programs in response to SSS incentives. Analyzing the relationship between different measures of competition (such as number of hospitals, Herfindhal Index) and expenditure among private hospitals in Bangkok, Bennett (1997) also found that markets with lower concentrations are associated with higher expenditures, although her study was not specific to the SSS market.[5] If indeed the result could be interpreted as quality competition, then the SSS would seem to be quite successful in motivating public hospitals to improve their quality. However, the lack of relationship between SSS market structure and conduct outside BKK suggests that there may exist a threshold level of competition below which competitive forces do not

[5] Bennett (1997) argued that the negative associations between market concentration ratio and expenditures could be interpreted as supply-induced demand. Her conclusion was based on a negative association found between market concentration ratio and fees adjusted for quality. However, this conclusion assumed that quality differences were fully adjusted for, which may not be the case.

have much influence on provider behavior. This result also suggests that competition may not be a viable strategy in rural areas that could not support a large number of providers.

An alternative explanation for the negative association between market concentration and cost of service in areas with low market concentration is that there may be "too many" SSS providers, thus leading to higher costs because hospitals cannot realize economies of scale. This interpretation would imply that the SSS could lead to a reduction in total welfare. Without knowing the cost structure of the hospitals and data on quality, it is not possible to draw any welfare implications based on the results, nor is it possible to identify which hypothesis is true. However, it is realistic to expect that both hypotheses are operating simultaneously.

Although both theory (Rogerson 1994; Ma 1994, Ellis 1998) and direct observation (Mills et al., 2000) by some predict that under the SSS incentives private hospitals would engage in risk selection, leaving the sicker, more costly patients for the public providers, the results do not provide strong evidence for this hypothesis. If private hospitals indeed competed by risk selection, one would expect to find reductions in the SSS market concentration to be associated with lower costs of service, especially in areas with greater private sector penetration. Irrespective of using cross-sectional measures or changes in private share, this study consistently found that the negative association between SSS market concentration and SSS costs is greater in areas with higher private sector penetration. Unfortunately, without directly observing quality and patient case mix, it is impossible to conclude with confidence that there is no risk selection.

Regression results demonstrate that the non-SSS market structure has a significant impact on providers' treatment pattern for the SSS patients. This may suggest that there is a spillover effect, in that hospitals respond to the non-SSS market structure and pass on the response equally to SSS and non-SSS patients. An alternative explanation is that hospitals shift costs from SSS to non-SSS patients, especially non-SSS patients who are reimbursed by FFS payments. In areas where the non-SSS market structure is more competitive, hospitals are more limited in shifting cost to the non-SSS payers; therefore, costs for SSS patients are higher in areas where the non-SSS market concentration is lower. However, to the extent that the capitation rate has been able to cover the costs for SSS beneficiaries and MCs have not been subject to cost-based selective contracting, this shifting may be a less likely phenomenon. Although this study cannot prove what exactly explains the relationship observed between SSS costs and non-SSS market concentration, its results provide a strong indication that any comprehensive evaluation of the SSS must take into account the non-SSS sector. This is important for countries similar to Thailand where hospitals receive payments from different insurers, each paying by a different method, and thus imposing different organizational and/or management incentives on the hospitals. Incentives for providers from one insurer and their impact on provider behavior cannot be studied in isolation from other incentives simultaneously facing providers.

Findings on internal/external management changes show MC hospitals adopting a number of initiatives, such as UR, essential drug list, and other quality assurance programs in response to the SSS. Both public and private hospitals do so equally, in contrast to literature hypothesizing that public hospitals are inflexible and thus incapable of change. In particular, MC hospitals changed physician payments to pass on the SSS incentives to the physicians. In public hospitals, where physicians are traditionally salaried, they became increasingly paid by FFS and bonuses for treating SSS patients in an effort to pass on quality improvement incentives. The private sector, which usually pays physicians by FFS, has introduced cost-saving incentives with more risk-sharing payments, like capitation. These results are encouraging for countries that are considering reform models similar to that of the UK, and yet do not have a well-developed general practitioner system like the UK's, for they suggest that capitation at the hospital level may be a feasible alternative strategy.

Limited by the quality and availability of data, interpretation of the results is only suggestive and associative. In particular, this study cannot link provider behavior to performance. Similarly, it can only study the combined incentives of the SSS, rather than separating the specific incentives and linking them to provider behavior. Also, it is limited to use geographic areas as markets, which hide much variations of market structure, especially for provinces like Bangkok. Nonetheless, its results provide evidence that incentive-based reforms similar to the SSS can create major changes in the market structure, which in turn impact the behavior of hospitals. Further, hospitals react by changing their internal management aimed at increasing quality, efficiency, and reducing costs. The results suggest cautious optimism for reforms similar to the SSS in developing countries.

This study also provides some important lessons on the process of implementing reforms. First, many countries lack the necessary data and information to assess the impact of the reform. To reduce error, it is advisable for countries to consider implementing reform on an experimental basis, accompanied by ongoing monitoring, data collection, and evaluation. Second, data collection should be guided by the objectives of the analyses. Using the case of the SSS in Thailand as an example, since capitation payment includes a spectrum of service from primary to tertiary care, one important incentive for the provider is to use lower (less costly) levels of care. Thus, understanding to what extent lower levels of care are substituted for tertiary and secondary levels of care would be important. This entails data from all levels, not just hospital admissions. Similarly, the SSO should consider keeping its records for more than one year in order to allow analysis over time. Until these are carefully designed and collected, further studies will be limited to producing associative and descriptive results.

Despite limitations, this study provides an overall framework that can be used to guide future research and data collection effort for evaluating the impact of capitation payment method. The findings also provide useful lessons for other developing countries contemplating to implement capitation payment:

a) Capitation payment, compared to fee-for-service, can be a useful tool in reducing the cost of service.

b) Internal management changes are likely to be necessary in order for the capitation payment incentives to be fully exercised. The government may consider initially introducing capitation payment to providers that have a greater capacity to implement such companion management changes.

c) In middle- and low-income countries where general practitioners are less well organized relative to advanced economies, capitating hospitals is an alternative and feasible strategy.

d) Capitation payment can have important implications on market structure and competitive behavior among providers subject to capitation payment incentives. It is important that the government understands and is able to anticipate these implications in order to design appropriate policies and necessary regulations.

e) If designed appropriately, other market mechanisms, such as private sector participation and free choice of consumers, can act to enhance the positive incentives (e.g., cost reduction) and mediate the negative incentives (e.g., quality reduction) of capitation payment.

f) Monitoring and evaluation are important to assure the proper functioning of the reform and good quality data should be collected for that purpose.

Annex A: District-level HI for Bangkok and Vicinity

Province	District	HI based on MC beneficiaries (HI_D1)				HI based on subcontractor beneficiaries (HI-D2)			
		1992	1994	1996	1998	1992	1994	1996	1998
Bangkok Metropolis	1	0.50	0.51	0.56	0.63	0.22	0.16	0.07	0.07
	2	1.00	0.68	0.57	0.57	1.00	0.39	0.38	0.39
	3	.	.	1.00	0.00	.	.	0.36	1.00
	4	.	.	.	.	.	.	0.13	0.15
	5	1.00	1.00	1.00	1.00	0.22	0.29	0.27	0.29
	6	.	.	.	.	1.00	1.00	0.16	0.50
	7	1.00	.	.	.	1.00	.	1.00	0.51
	8	1.00	1.00	1.00	.	1.00	0.70	0.41	0.19
	9	1.00	1.00	1.00	1.00	0.53	0.23	0.11	0.24
	10	.	.	.	.	.	.	0.25	0.10
	11	0.72	0.35	0.28	0.28	0.23	0.22	0.26	0.31
	12	1.00	1.00	0.72	0.72	1.00	0.25	0.08	0.14
	13	1.00	0.50	0.55	0.62	0.95	0.40	0.34	0.42
	14	.	.	1.00	1.00	.	1.00	0.16	0.20
	15	.	.	.	.	.	.	0.37	0.36
	16	.	.	.	.	.	.	0.18	0.17
	17	0.70	0.63	0.51	0.52	0.60	0.51	0.64	0.91
	18	.	.	.	.	.	0.39	0.14	0.34
	19	.	.	.	.	1.00	0.37	0.10	0.12
	20	1.00	1.00	0.62	0.64	1.00	1.00	0.46	0.42
	21	.	.	.	.	1.00	1.00	0.19	0.34
	22	1.00	0.63	.	.	1.00	0.61	0.24	0.21
	23	0.52	0.55	1.00	0.51	0.69	0.18	0.07	0.07
	24	.	.	.	.	.	.	0.51	1.00
	25	1.00	0.51	0.53	0.51	1.00	0.43	0.17	0.71
	26	.	.	1.00	1.00	.	0.48	0.19	0.38
	27	0.73	0.57	1.00	1.00	0.21	0.58	0.09	0.11
	28	0.35	0.38	0.30	0.28	0.33	0.47	0.26	0.27
	29	.	.	0.59	0.43	.	0.28	0.16	0.18
	30	.	.	.	.	0.64	0.40	0.13	0.11
	31	.	.	.	.	.	.	0.15	0.27
	32	.	.	.	.	.	.	0.17	0.59
	33	1.00	1.00	1.00	1.00	0.26	0.32	0.29	0.24
	34	1.00	1.00	1.00	1.00	0.65	0.28	0.19	0.13
	35	.	.	.	.	1.00	0.63	0.18	0.22

	36	0.54	1.00	1.00	1.00	0.54	0.82	0.53	0.27
	38	.	.	.	.	1.00	.	.	.
Nakhon Pathom	1	0.92	0.54	0.66	0.63	0.62	0.37	0.71	0.34
	2	.	.	.	.	1.00	0.42	1.00	0.80
	3	.	.	.	.	1.00	1.00	1.00	0.68
	4	.	.	.	.	1.00	0.58	1.00	0.18
	5	.	.	.	.	1.00	0.50	1.00	0.66
	6	.	.	.	.	.	.	1.00	0.29
	7	.	.	.	1.00	0.50	0.43	0.25	0.16
	8	.	.	.	.	1.00	1.00	1.00	0.68
Nonthaburi	1	.	0.54	0.57	0.71	1.00	0.27	0.47	0.24
	2	.	.	.	.	.	0.54	0.52	0.51
	3	.	.	.	.	.	0.54	0.52	0.40
	4	.	.	.	.	.	0.36	0.23	0.32
	5	.	.	1.00	1.00	.	0.75	0.30	0.82
	6	.	.	1.00	1.00	.	0.27	0.13	0.26
Pathum Thani	1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	2	0.44	0.50	0.47	0.48	0.41	0.54	0.66	0.61
	3	.	1.00	0.83	0.60	0.51	0.65	0.54	0.44
	4	.	.	.	.	1.00	1.00	1.00	1.00
	5	.	.	1.00	1.00	1.00	1.00	0.49	0.83
	6	.	.	.	.	1.00	.	.	1.00
	7	.	.	.	.	1.00	1.00	.	1.00
Samut Prakan	1	0.37	0.46	0.31	0.28	0.37	0.22	0.15	0.10
	2	.	.	.	.	1.00	1.00	0.21	0.27
	3	0.00	0.60	0.30	0.25	0.55	0.29	0.09	0.16
	4	.	.	1.00	0.48	0.46	0.24	0.08	0.06
	5	.	1.00	1.00	1.00	1.00	0.58	0.15	0.17
Samut Sakhon	1	0.56	0.50	0.42	0.50	0.76	0.32	0.22	0.23
	2	.	1.00	0.52	0.52	0.61	0.48	0.13	0.26
	3	.	1.00	1.00	1.00	1.00	0.96	0.32	0.27

Annex B: Market Structure Indicators

Market Structure Indicators for Bangkok and Vicinity

Variables	Mean (std dev)	Correlation				
		DHI_{sss}	HI_{sss97}	$HI_{non\text{-}sss98}$	*Privsh97*	*DPrivsh*
DHI_{sss}*	-0.097 (0.047)	1				
HI_{sss97}	0.136 (0.144)	0.144	1			
$HI_{non\text{-}sss98}$	0.160 (0.119)	-0.682	0.579	1		
Privsh97	0.804 (0.124)	-0.581	0.139	0.704	1	
*DPrivsh***	0.346 (0.265)	0.757	0.405	-0.168	0.028	1

Market Structure Indicators for Outside Bangkok and Vicinity

Variables	Mean (std dev)	Correlation				
		DHI_{sss}	HI_{sss97}	$HI_{non\text{-}sss98}$	*Privsh97*	*DPrivsh*
DHI_{sss}*	-0.061 (0.072)	1				
HI_{sss97}	0.466 (0.244)	0.811	1			
$HI_{non\text{-}sss98}$	0.210 (0.092)	0.206	0.236	1		
Privsh97	0.338 (0.356)	-0.604	-0.695	-0.095	1	
*DPrivsh***	0.132 (0.272)	0.021	-0.055	0.539	0.489	1

*: DHI_{sss} is calculated as the annual rate of change of HI_{sss} between 1992 and 1997.

**: *DPrivsh* is calculated as the absolute change in the share of private enrollment between 1992 and 1997 since many providers started with a zero private share in 1992.

Annex C: Questionnaire for Hospital Management Interviews

The Social Security System (SSS)

Impact of Capitation on the Management of Contractor Hospitals

BACKGROUND INFORMATION

1. Name of Institution
   _____

2. Location of Institution
   _____

3. Type of Institution
   - ❑ Government / Public
   - ❑ Private
     ( ) Independent
     ( ) Hospital chain

4. How would you describe your institution?
   - ❑ Hospital
     ( ) General
     ( ) Teaching
     ( ) Specialty
     ( ) Other (Please specify) _____
   - ❑ Clinic
   - ❑ Multi-clinic
   - ❑ Other (Please specify) _____

5. Number of years in operation _____

6. Number of beds _____

7. Number of Full-time Physicians _____
   Number of Part-time Physicians _____

8. Which specialty services does your institution provide? Please check all that apply
   - ❑ General practice
   - ❑ Internal Medicine
   - ❑ Surgery
   - ❑ Orthopaedics
   - ❑ ENT
   - ❑ Ophthalmology
   - ❑ Neurosurgery
   - ❑ Cardiology
   - ❑ Obstetrics and Gynaecology
   - ❑ Paediatrics
   - ❑ Geriatrics
   - ❑ Psychiatry
   - ❑ Others (Please specify) _____

9. Social Security Scheme Contract
   - ❑ Main contractor

Which year did you begin as a main contractor? _____
   - ❑ Subcontractor

Which year did you begin as a subcontractor? _____

Please specify three of the most important reasons that influenced the decision for your institution to enroll in the SSS:

a) _____

b) _____

c) _____

10. What is the percentage breakdown of your inpatient and outpatient volume by the following categories?

Forms of Financing	Inpatient volume (percent)	Outpatient volume (percent)
SSS patients		
CSMB		
Private insurance		
Health card		
Patient out-of-pocket		
Other		

11. Name of Interviewee _____

Position _____

Duration at present position _____

Duration of employment at this institution _____

Previous position _____

Were you in an administrative position during the first year of this institution becoming a main contractor or subcontractor under the SSS?

- ❑ Yes
- ❑ No

I. CONTRACTING

This section pertains to information on the number, the types, and the management of contracts between the main contractor and subcontractor.

A. Types of Contracts

OWN Facilities and services owned by the main contractor
FFS Fee-for-service contract (or modulated) with providers not owned by the main contractor
CD Capitation contract directly with providers not owned by the main contractor
CI Capitation contract with intermediary
No Services not offered
UK Information unknown

B. List of Services

A-1 Ambulatory Consultation
A-11 Low Complexity
A-12 High Complexity
A-2 Clinical Discharges
A-3 Surgical Discharges
A-4 Births
A-41 Normal Births
A-42 Caesarian Births
A-5 Ambulatory Surgery
A-6 ER

** Note the abbreviations for Type of Contracts and List of Services can be used in Tables that follow*

For the Interviewer:
The following is an example for filling in the Table on the next page:

Type of service	1990		1991		1992		1993	
	Type of contract	No. of contracts	Type of contract	No. of contracts	Type of contract	No. of contracts	Type of contract	No. of contracts
A-41	FFS	3	FFS	3	FFS	2	FFS	0
A-41					CD	1	CD	3
A-4	No		Own	2	Own	1	CI	2
A-4					CI	2	CD	2

A-41 Normal births:
In 1990, this hospital had 3 FFS (fee-for-service) contracts with providers not owned by it. This remained unchanged in 1991. In 1992, the FFS contracts decreased to 2, and the hospital entered into 1 CD (capitation contract directly with providers not owned by it). In the following year, all contracts for normal births were CDs.

In the interest of analyzing the trend in types and number of contracts used in the delivery of specific services over the last ten years, kindly use the Type of Contract abbreviations (OWN, FFS, CD, CI, No, UK) and Services code (e.g. A-1, A-2 etc) to fill in this table:

Type of service	1991		1992		1993		1994		1995		1996		1997		1998	
	Type of contract	No. of contract	Type of Contract	No. of contract	Type of contract	No. of contract	Type of contract	No. of contract	Type of contract	No. of contract	Type of contract	No. of contract	Type of contract	No. of contract	Type of contract	No. of contract
A-1																
A-2																
A-3																
A-4																
A-5																
A-6																
A-11																
A-12																
A-41																
A-42																

Contracts Management: Managing the Subcontractor
(Please check all that apply)

Management of Contracts	Subcontractor A	Subcontractor B	Subcontractor C

EXPENDITURE MANAGEMENT
• Payment types
  ➢ Fee-for-service
  ➢ Capitation
  ➢ Per admission or per visit
  ➢ Global Budget
• Performance payment
➢ Withhold
  ➢ Bonus
• Profit sharing
• Utilization review
• Group of experts to oversee and override decisions of individual doctors
• Permission for
  ➢ Referral
  ➢ Diagnostic tests
  ➢ Experimental procedures
• Wide area computer network between main contractor and subcontractors
  ➢ To shift patients or resources to optimize underutilized resources
  ➢ To monitor costs at each point of service (e.g. cost accounting) to facilitate electronic patient billing			

QUALITY MANAGEMENT Random checking of medical records • Requiring hospital accreditation • Requiring attainment of ISO 9000 • Producing mortality profiles of subcontractors • Monitoring number of medical mishaps • Patient complaints • Set of documented practice protocols • Regular meetings with subcontractor			

II. INTERNAL MANAGEMENT AND ORGANIZATION STRUCTURE

Section III pertains to changes in the INTERNAL management structure of your institution in preparation for, or in response managing the capitation payment of the SSS.

A. Organizational Structure

1. Were new departments or units in management created for managing the SSS contract?
- ❑ No
- ❑ Yes. Please specify

_____
_____

2. Were existing departments or units in management removed or reconfigured for managing the SSS contract?
- ❑ No
- ❑ Yes. Please specify

_____
_____

3. Were new positions in management created for managing the SSS contract?
- ❑ No
- ❑ Yes. Please specify (with brief description of roles played)

_____
_____

4. Were existing positions in management ended or redefined for managing the SSS contract?
- ❑ No
- ❑ Yes. Please specify (with brief description of discontinued, or new roles)

_____
_____

B. Policies involving Physicians

1. As a result of SSS, is there any change in the specialty mix of physicians you hire?
- ❑ No
- ❑ Yes. If yes, do you hire:
  - ( ) More GPs
  - ( ) More surgical specialists

2. Do you have physicians specifically assigned to SSS patients?
- ❑ No
- ❑ Yes

3. If you answered yes to the preceding question (Q2), are these physicians paid differently?

❑ No

❑ Yes. If yes, please check all that apply in the following table:

	SSS	Non-SSS
In comparing SSS physicians and other physicians, how are physicians paid? • Salary • Salary + bonus • Capitation • Fee-for-service • Other incentives: Please specify _____ _____ • Gatekeeper system where GPs control the cash		

4. Is the performance of SSS and non-SSS physicians monitored differently?

❑ No

❑ Yes. If yes, please check all that apply in the following table:

	SSS	Non-SSS
• Utilization review and efficiency measurement • Pre-admission authorization		

5. Are SSS and non-SSS physicians subject to different forms of utilization review?

❑ No

❑ Yes. If yes, please check all that apply in the following table:

	SSS	Non-SSS
• Essential Drug list • Practice guidelines or rules • Random checking of medical records • Monitoring number of medical mishaps • Patient complaints about physicians		

B. Quality Management

1. Does your hospital use the following measures for quality assessment? Please check all that apply

❑ Monitoring patient complaints about overall hospital care

❑ Analyzing the mortality profile of the hospital

❑ Studying the trend of the rate of readmission

❑ Monitoring the average length of stay

❑ Fulfilling the Hospital Accreditation criteria

❑ Fulfilling the ISO 9000 criteria

2. For quality assurance, does the hospital
    - ❑ Address identified problems with input from the bottom up (e.g. involving staff in the closest contact to the problem at hand)
    - ❑ Keep staff informed on recurring problems and provide training to overcome them

C. Human Resource Management and Development

Culture of institution

Staff involved in planning for change

Staff re-educated in anticipation of the change

Staff informed and empowered

For the management and development of health professionals, are the following available?
- ❑ Continuous medical education
- ❑ Periodical review to renew medical license to practice
- ❑ Peer review boards for physician self-regulation

D. Information Systems and Cost Accounting Systems

1. Did you build a new information system in preparation for the SSS?
    - ❑ No
    - ❑ Yes

2. If a Local Area Network was built, what were its objectives?
    - ❑ To keep track of costs more accurately
    - ❑ To maintain patient medical records for quality monitoring
    - ❑ To facilitate electronic patient billing
    - ❑ To enable efficient resource management
    - ❑ To provide expert systems for clinical decisionmaking

3. If a Wide Area Network between main contractors and subcontractors was built, what were its objectives?
Communication and coordination
    - ❑ Continuity of care
    - ❑ Resource management

4. Did your information system enable health data connectivity for
    - ❑ Telemedicine – consulting experts in other locations, customer care (e.g., call centers)
    - ❑ Accessing health data sources

After SSS, was there a greater demand for accurate and up-to-date information on costs, procedures, and outcomes?
    - ❑ No
    - ❑ Yes

6. Is your current Cost Accounting system effective in

- ❑ Allocating periodic production costs between goods and services sold, and goods still in inventory
- ❑ Providing feedback on resources consumed
- ❑ Determining costs of individual products throughout its entire value added chain

7. Is your Cost Accounting system used to address the use of resources in
   - ❑ Comparisons between or among sites (e.g. main contractor and subcontractors)
   - ❑ Comparisons between different treatment modalities

8. Did the Social Security Scheme lead to the decision to integrate vertically with subcontractors?
   - ❑ No
   - ❑ Yes. Please specify _____

III. ENVIRONMENT

1. In determining the environment your institution is operating in, how do you ascertain (Please check all that apply):

a) Market demand for your services
- ❑ Market survey research
- ❑ Utilization rates
- ❑ Waiting lines

b) The perceived quality of your services
- ❑ Patient satisfaction survey
- ❑ Complaints lodged against your institution
- ❑ Medical malpractice suits

c) Competition from other providers
- ❑ Number of providers offering similar services
- ❑ Your market share
- ❑ Drop in utilization rates

d) Reliability of your suppliers as a source of equipment, supplies, etc
- ❑ Inventory
- ❑ Shortages of supplies

e) The need to invest in new technology
- ❑ Equipment running at full capacity
- ❑ Competitors have procured new technology
- ❑ Not meeting accreditation criteria
- ❑ Not meeting ISO 9000 criteria

f) ernment regulation – whether it will facilitate or impede your operations

Annex D: Relationship between Cost of SSS and Market Concentration

Relationship between Cost of SSS and Market Concentration for Bangkok and Vicinity Provinces

	Total cost/day	Drug cost/day	Probability of lab	Conditional lab cost/day	LOS
$Pub*^{\Delta}Hi_{sss}$	-0.492 (1.348)	-2.863 (1.893)	-10.311 (16.067)	-25.10*** (4.225)	3.477* (1.668)
$^{\Delta}Hi_{sss}$	6.554*** (0.514)	11.393*** (0.719)	-33.14* (14.448)	8.535*** (1.105)	-0.825 (0.636)
$Pub*^{\Delta}Hi_{sss}$ *Privsh	-2.345 (1.678)	2.928 (2.351)	27.564 (17.423)	23.955*** (5.664)	-3.210 (2.077)
$^{\Delta}HI_{sss}$*Privsh	-6.181*** (0.537)	-11.74*** (0.753)	23.319 (14.759)	-6.402*** (1.229)	1.279 (0.665)
$Pub*Hi_{non\text{-}sss}$	-1.718*** (0.233)	0.669* (0.329)	-10.31*** (2.212)	2.747*** (0.592)	-1.414*** (0.289)
$HI_{non\text{-}sss}$	-1.735*** (0.312)	0.273 (0.440)	3.814 (2.725)	0.399 (0.911)	-1.025** (0.386)
Pubhosp	-1.150*** (0.053)	-1.760*** (0.074)	-0.972 (0.503)	-1.803*** (0.130)	0.517*** (0.065)
N	7398	7385	7398	7075	7398
R-square	0.636	0.470	0.413	0.090	0.417

Note: *** indicates p-value<0.005, ** indicates p-value<0.01, * indicated p-value<0.05. All variables in appendix 1 were included but not reported here.

Relationship between Cost of SSS and Market Concentration outside Bangkok and Vicinity Provinces

	Total cost/day	Drug cost/day	Probability of lab	Conditional lab cost/day	LOS
$Pub*^{\Delta} Hi_{sss}$	0.385 (0.478)	-0.652 (0.593)	-2.991 (8.411)	-1.475 (0.873)	0.127 (0.489)
$^{\Delta} Hi_{sss}$	1.603*** (0.425)	1.790*** (0.527)	10.733 (8.371)	1.928* (0.746)	-0.188 (0.434)
$Pub*^{\Delta} Hi_{sss} *Privsh$	1.473 (0.758)	0.953 (0.936)	-12.18 (16.550)	5.652*** (1.389)	1.522* (0.774)
$^{\Delta} HI_{sss} *Privsh$	-10.40*** (1.063)	-9.134*** (1.315)	-31.521 (17.053)	-5.322*** (2.169)	0.448 (1.086)
$Pub*HI_{non\text{-}sss}$	-0.400 (0.272)	-0.219 (0.335)	12.83*** (3.793)	0.502 (0.500)	-0.911*** (0.277)
$HI_{non\text{-}sss}$	-0.259 (0.252)	-0.479 (0.311)	-14.39*** (3.783)	-1.661*** (0.454)	0.931*** (0.257)
Pubhosp	-1.168*** (0.094)	-1.144*** (0.116)	-8.919*** (1.684)	-0.795*** (0.169)	0.390*** (0.096)
N	4678	4652	4680	3387	4680
R-square	0.631	0.455	0.1974	0.177	0.367

Note: ***represents p-value<0.005, ** indicates p-value<0.01, * indicated p-value<0.05. All variables in appendix 1 were included but not reported here.

Annex E: Hospital Contractor Network Interview Profiles

Main Contractor Hospital #1

Background

Hospital 1 was a private independent hospital located in one of mixed industrial-residential areas of Bangkok. Having 100 beds, the hospital has been in operation for 25 years. It had approximately 10 full-time physicians and 81 part-time physicians, and provided services with all medical specialties. Some 48 percent of outpatients were social security beneficiaries while 31 percent of outpatients paid out-of-pocket, some 14 percent had private health insurance and some 7 percent were government officers. However, for inpatient services, the out-of-pocket group accounted for 66 percent. The social security patients were 23 percent whereas privately insured patients accounted for 8 percent and government officers was about 3 percent.

The hospital has participated in the social security scheme as a main contractor since 1991. Three major reasons for the participation were:

1. To secure the number of patients
2. To gain more revenue
3. To help people and the country.

Internal service management

- Organization structure to support social security services

There were no departments or units in management created or removed for managing the SSS contract. There was no new management position either.

- Management of physicians for SSS

There was a change in the specialty mix of physicians hired as a result of SSS. The hospital employed more general practitioners for primary care services. Different modes of payment might be used. Physicians were paid on salary with bonus and fee-for-services with minimum guarantee for non-SSS patients. On the other hand, for SSS patients, they were paid on salary with bonus or capitation.

- Utilization review activities

The same monitoring system and utilization review measures monitored the physicians regardless the groups of patients they provided care.

- Quality management

A number of quality assessment and assurance measures were applied in the hospital including:

1) Monitoring patient complaints about overall hospital care and waiting time
2) Analyzing the mortality profile of the hospital

3) Studying the trend of the rate of readmission
4) Monitoring the average length of stay.

The quality assurance of the hospital encouraged that problems were addressed with inputs from the bottom-up process. The hospital attempted to keep staff informed on recurring problems and provide training to overcome them.

- Information and cost accounting system

A new information system was set up in preparation for the SSS. A local-area network was established with objectives to keep track of costs more accurately, to maintain patient medical records for quality monitoring, to facilitate electronic patient billing, to enable efficient resource management and to provide expert systems for clinical decision making.

There was a greater demand for accurate and up-to-date information on cost, procedures and outcomes. The hospital's cost accounting system was capable of allocating periodic production costs between goods and services sold and goods still in inventory, providing feedback on resources consumed and determining costs of individual products throughout its entire value added chain. It was used for comparisons of the use of resources among sites and between different treatment modalities.

Subcontractor management

- Contracting services

Since 1995, the hospital has formed a network of subcontractors to provide ambulatory care consultation and emergency care for the SSS patients. The subcontractors comprised private physician clinics and polyclinics. The numbers in 1995-1998 were 34, 38, 42, and 44, respectively.

- Subcontractor payment

The hospital paid subcontractors primarily on a per-visit basis. Capitation payment was also used with some clinics.

- Utilization review

Utilization review measures were applied to the subcontractors. There was a group of experts to oversee and override decisions of individual physicians. Pre-authorizations were required for referral, diagnostic tests and experimental procedures. However, there was no wide-area computer network between the main contractor and subcontractors.

- Quality management

A few approaches of quality management were put to use with subcontractors, including random checking of medical records, reviewing mortality profiles of subcontractors, monitoring number of medical mishaps and patient complaints, documented practice protocols and regular meetings with subcontractors.

Main Contractor Hospital #2

Background

Hospital 2 was a 18-year-old, military-owned public general hospital located in the northern area of Bangkok. The hospital had 700 beds and affiliated with a university providing medical training at undergraduate and postgraduate levels. It had approximately 200 full-time medical staff providing all specialties.

The hospital has participated in the social security scheme since 1991. The primary reason for the participation was that it was the government policy. So far, the hospital has not had any subcontractor due to the regulations set by the owner agency.

Internal service management

- Organization structure to support the social security services

There was a new administrative unit, called the Social Security Service Unit (SSS unit), set up to manage the SSS contract. The unit was led by the unit head and had 12 clerks.

- Management of physicians for SSS

There was no change in the specialty mix of physicians in the hospital due to SSS. No physician was specifically assigned to SSS patients. All physicians were paid on salary. Those who provided services to SSS patients received additional fee-for-service payment. There was no gatekeeper physician.

- Utilization review activities

A number of measures were applied to monitor service utilization for all patients. Utilization review and efficiency measurements were applied to all, including essential drug lists, practice guidelines or rules, random checking of medical records, monitoring of medical mishaps, patient complaints about physicians. However, only SSS patients needed pre-authorization for inpatient admission. The pre-authorization was not required for non-SSS patients.

- Quality management

A number of quality assessment and assurance measures were applied in the hospital including:

1) Monitoring patient complaints about overall hospital care and waiting time
2) Analyzing the mortality profile of the hospital
3) Studying the trend of the rate of readmission
4) Monitoring the average length of stay
5) Working on fulfilling the hospital accreditation standards.

The quality assurance of the hospital encouraged that problems were addressed with inputs from the bottom-up process. The hospital attempted to keep staff informed on recurring problems and provide training to overcome them.

- Information and cost accounting system

There was no new information system or network set up in preparation for the SSS. After joining SSS, the hospital experienced no greater demand for accurate and up-to-date information on cost, procedure and outcomes. However, the hospital reported that at that time it had no cost accounting system.

Main Contractor Hospital #3

Background

Hospital 3 was a 58-year-old, provincial general hospital located in a northeastern province of the country. Owned by the Ministry of Public Health (MOPH), the hospital had 543 beds. It reportedly had 44 full-time medical staff providing all specialties except neurosurgery and geriatrics. The hospital provided outpatient services mostly to patient with health cards (44.5 percent) and low-income patients (49.0 percent). Only 6.5 percent of outpatients were social security beneficiaries. The proportions for inpatients were somewhat different—38.0, 60.9 and 1.1 percent, respectively.

The hospital has become a main contractor under the social security scheme since 1992. The first three main reasons for the enrollment were that:

1. The hospital had to serve all types of patients anyway. Joining the scheme was a way to increase hospital revenue.
2. It helped to collaborate with other public health facilities
3. The hospital was the only main contractor in the area in 1992.

The hospital had 17 community hospitals in the province as subcontractors, beginning in 1994. They provided only outpatient services.

Internal service management

- Organization structure to support the social security services

There was a new administrative unit set up to manage the SSS contract along with car-accident insured patients. The unit had a program manager, a nursing coordinator and a clerk.

- Management of physicians for SSS

There was no change in the specialty mix of physicians in the hospital due to SSS. No physician was specifically assigned to SSS patients. All physicians were paid on salary with no difference whether they served SSS or non-SSS patients. However, they got bonus payments if the SSS fund had profit. There was no gatekeeper physician.

- Utilization review activities

There were no system to monitor and review utilization of SSS and non-SSS patients. Nevertheless, the hospital applied essential drug lists, random checking of medical records and reviewing patient complaints about physicians to both of the groups.

- Quality management

The hospital monitored patient complaints about overall hospital care, and addressed identified problems with inputs from the bottom up. All hospital personnel received training once a year, on average.

- Information and cost accounting system

The hospital set up a new information system or network set up in preparation for the SSS. But no local area network was established to accommodate the service. After joining SSS, Hospital 3 experienced no greater demand for accurate and up-to-date information on cost, procedure and outcomes. However, the hospital reported that at that time it had no cost accounting system. In addition, the social security scheme did not lead to any decision to integrate vertically with subcontractors.

Subcontractor management

- Contracting services

The hospital formed a network by contracting 17 community hospitals. They provided only outpatient services.

- Subcontractor payment

Subcontractors were paid by global budget. There were also withholds and bonus payment.

- Utilization review

Limited utilization review was used, including a review on the use of computerized tomography (CT scan), of which individual physicians' decisions could be overridden. There was no requirement of permission for referral, other diagnostic tests and experimental procedures. No wide-area computer network was built.

- Quality management

Random checking of medical records, monitoring of patient complaints, sets of documented practice protocols and regular meetings with subcontractors were measures applied by the hospital to assure quality of subcontractors.

Main Contractor Hospital #4

Background

Hospital 4 was a private independent hospital located in an industrial area of Samutprakarn, a vicinity province of Bangkok. The hospital has been in operation for 18 years and had 150 beds. It had about 20 full-time physicians and 85 part-time physicians, and provided services with all medical specialties. Some 39.5 percent of outpatients were social security beneficiaries while 37.5 percent of outpatients paid out-of-pocket, some 19.1 percent had private health insurance and some 4 percent were other groups. For inpatient services, the out-of-pocket group accounted for 49.2 percent. Some 26.5

percent were social security patients whereas privately insured patients accounted for 20.4 percent and other groups were about 3.7 percent.

The hospital has participated in the social security scheme as a main contractor since 1995. Three major reasons for the participation were:

1. To maintain the customer base because of the location of the hospital, half of the customers were factory and office employees
2. To drive down fixed cost of the hospital
3. To strengthen image and reputation of the hospital.

Internal service management

- Organization structure to support social security services
-

The hospital's outpatient department was expanded to accommodate SSS patients. A new social security department was created particularly for taking care of this group of patients in 1996. A number of new working procedures and systems were established, such as service standard control, a drug-list system, a management information system, a billing and claim management system.

There were three new administrative positions created for managing the SSS contract—a program manager, a nursing coordinator and a clerk. There were also some adjustments to the responsibilities of the customer relation department, which used to take care of the SSS after the establishment of the new department.

The SSS did not lead to the decision to integrate vertically with subcontractors.

- Management of physicians for SSS

There was a change in the specialty mix of physicians hired as a result of SSS. The hospital employed more general practitioners for primary care services. A few of hospital surgeons were particularly contracted to take care of SSS patients.

Different modes of physician payment were used for SSS and non-SSS patients. Basically for non-SSS patients, physicians were paid on fee-for-services with minimum guarantee. By contrast, for SSS patients, they were paid on capitation monthly, although some services were still paid fee-for-service. The capitation rate was calculated based on historical data of how much they earned from this group of patients and varied according to the total pool of registered beneficiaries at the hospital. The capitated services included surgery, obstetrics and gynecology, and orthopedics. Bonus payments were distributed to each departments according to performance and if the SSS fund was profitable.

- Utilization review activities

Utilization review and efficiency measurement was primarily applied to SSS patients, but not non-SSS patients. While the hospital used random checking of medical records and monitoring number of medical mishaps for all patients, the hospital applied pre-admission authorization for which general practitioners must consult specialists before admission, essential drug lists, and patient complaints about physicians to SSS patients only.

- Quality management

A number of quality assessment and assurance measures were applied in the hospital including:

1) Monitoring patient complaints about overall hospital care and waiting time
2) Analyzing the mortality profile of the hospital, along with nosocomial infection control.
3) Monitoring the average length of stay by diagnosis group.
4) Fulfilling the ISO 9000 criteria.

The quality assurance of the hospital encouraged that problems were addressed with inputs from the bottom-up process, depending upon the level of problems.

- Information and cost accounting system

A new information system was set up in preparation for the SSS. The hospital assigned a special code for SSS patients. The patient and treatment-related data were computerized. Services for other groups of patients were less computer-intensive. A local-area network was established with objectives to keep track of costs more accurately, and to facilitate electronic patient billing.

There was a greater demand for accurate and up-to-date information on cost, procedures and outcomes. The hospital's cost accounting system was capable of allocating periodic production costs between goods and services sold and goods still in inventory and providing feedback on resources consumed.

Subcontractor management

- Contracting services

Since 1996, the hospital has formed a network of subcontractors to provide ambulatory care consultation and emergency care for the SSS patients. The subcontractors comprised private physician clinics and polyclinics. The numbers in 1996-1998 were 4, 4, 7 and 8, respectively.

The trend was to continue expanding the contracted network providers. Subcontractors provided:

1. Ambulatory medical care services (including drug dispensing)
2. Some minor ambulatory surgery
3. Some minor emergency care

Severe cases or high-cost cases were required to be transferred to the hospital.

- Subcontractor payment

The hospital paid subcontractors primarily on a per-visit basis and based on fee schedules. The examples were as follows:

Baht 145 for the first ambulatory visit
Baht 65 for a follow-up visit within 1 week
Baht 120 for a incision and drainage procedure
Baht 35 for a wound care.
There was no preset monthly or yearly payment limit.

- Utilization review

Utilization review measures were applied to the subcontractors. Claim statistics from subcontractors were closely monitored along with retrospective chart review for unusual practice pattern.

However, there was no group of experts to oversee or override decisions of individual physicians. Pre-authorizations were required for referral such that high-cost cases were referred to the main contractor only. There was no requirement of pre-authorization for diagnostic tests since their expenses were included in the per-visit amount of payment.

- Quality management
-

A few approaches of quality management were put to use with subcontractors, including random checking of medical records, monitoring number of medical mishaps and patient complaints. A set of documented practice protocols was available for Rabies vaccine. There was also an annual meeting with subcontractors.

Main Contractor Hospital #5

Background

Hospital 5 was a 97-year-old tertiary-care hospital located in the eastern seaboard area of the country. The hospital belonged to a not-for-profit organization; however, due to the nature of its funding, which came from the governmental budget, it was considered a public hospital. It had 500 beds with approximately 76 full-time physicians and two part-time physicians, offering all medical-specialty services.

The hospital has become a main contractor of the social security scheme since 1991. Three major reasons that influenced the decision for enrollment were:

- The hospital received the governmental budget, so it should cooperate with the governmental policy
- It was an opportunity to generate additional revenue to subsidize the poor
- The hospital wanted to learn about the social security scheme.

In 1998, the hospital became the largest public main contractor network of the social security scheme in terms of the number of registered beneficiaries. It had slightly more than 100,000 registered beneficiaries.

Internal service management

- Organization structure to support social security services

The hospital set up a new office, called “Social Security Project Office”, in 1996 to take direct responsibility for SSS services. Previously, it was a responsibility of many departments across the hospital. In addition, there was the social security administrative committee. There were two new administrative positions created for managing the SSS contract, including the chairman of the committee and the social security project office manager.

The hospital set up the social security fund. The fund was managed by the Social Security Project Office. For the purpose of internal fund management, the office contracted the hospital to provide services for social security beneficiaries.

- Management of physicians for SSS

To accommodate the SSS, there was a change in the specialty mix of physicians hired by the hospitals. The hospital hired a part-time psychiatrist. Other medical staff to provide care for the SSS were recruited from within the hospital. The off-office-hour clinic of the hospital was contracted to provide services during the off-office-hour period.

Normally, physicians were on salary. When physicians who took care of SSS patients, they were paid differently from others. During office hours, the hospital's SSS clinic paid extra fees for physicians working for the clinic, Baht 500 per hour plus Baht 5 per case. The off-office-hour services were paid according to the rates set by the clinic.

All hospital staff would receive annual bonus payments from a budget set aside from the social security fund of the hospital. The amount depended upon the hospital performance. There were also benefit payments to departments within the hospital.

- Utilization review activities

Services provided to SSS patients were subject to utilization review and efficiency measurement. The UR activities included pre-admission authorization, essential drug list, practice guidelines, occasional random checking of medical records, monitoring of medical mishaps and patient complaints about physicians. Non-SSS patient services were also reviewed by these techniques, except pre-admission authorization and random checking of medical records.

- Quality management

A number of quality assessment and assurance measures were applied in the hospital including:
1) Monitoring patient complaints about overall hospital care and waiting time
2) Monitoring the average length of stay
3) Working on fulfilling the hospital accreditation standards

The quality assurance of the hospital encouraged that some problems were addressed with inputs from the bottom-up process, and attempts to keep staff informed on recurring problems and provide training to overcome them.

- Information and cost accounting system

A new information system was set up in preparation for the SSS including a balance sheet, an income statement and expenses of contracted network providers. The hospital's local-area-network used a minicomputer to keep track of costs, to maintain patient medical records for quality monitoring, to facilitate electronic patient billing and to enable efficient resource management.

The cost account system was not fully developed. It was used to address the use of resources in comparing between sites.

Subcontractor management

- Contracting services

The hospital has been developing a network of subcontractors for its social security services since 1993, two years after it joined the scheme.

Subcontractors and services	1992	1993	1994	1995	1996	1997	1998
Ambulatory consultation	0	12	13	20	28	40	82
Emergency	0	0	0	0	2	2	4
Medical inpatient	0	0	0	0	2	2	4
Surgical inpatient	0	0	0	0	2	2	4
Obstetrics							
- **Normal delivery**	0	0	0	0	0	0	0
- **Cesarean section**	0	0	0	0	0	0	0
Ambulatory surgery	0	0	0	0	2	2	2

- Subcontractor payment

Private clinic and private hospital subcontractors were paid on a per-visit basis. The main contractor (MC) hospital paid Baht 150 per visit (doctor fee = Baht 50 + Baht 100 medication), plus additional payment for expensive treatment or injections using the price lists at the MC hospital. Private hospital subcontractors were also paid fee-for-services for minor surgical procedures not exceeding Baht 400 per case. Inpatient services were paid according to fee schedules. Public hospitals and health centers were reimbursed on a charge-based basis. There was no doctor fee. The MC hospital would pay 75 percent of the claimed amounts up-front and would pay the rest after claims were reviewed. There was no bonus or profit sharing provision.

- Utilization review

Extensive utilization review programs were applied to private subcontractors. UR for private clinics and polyclinics included essential drug lists, retrospective review of clinic bills, and inspection of medical records as needed. The review target would be clinics with more than 300 visits per month. However, there was no predetermined visit limit.

Private hospital subcontractors were subject to pre-admission authorization, pre-authorization for surgical procedures and diagnostic procedures, essential drug list, the list of “must refer” diseases, concurrent hospital review after three days of hospital stay, retrospective review of hospital bills and medical records, and review of subcontractors’ employee service utilization. A group of experts was set to oversee and override the decisions of individual physicians at private hospital subcontractors. The list of diseases with which patients must be transferred to the MC hospitals included chronic cases, operative orthopedic cases and expensive inpatients that have expected length of stay over seven days or expenses over Baht 20,000).

Subcontractors that were public hospitals and health centers were only subject to pre-authorization for hospital stay longer than seven days.

- Quality management

There was random checking of medical records of subcontractors that were private clinics and hospitals. Patient complaints, sets of documented practice protocols, and regular meetings with

subcontractors were required for private hospital subcontractors. There was no specific quality assurance requirement for public hospitals and health centers.

Main Contractor Hospital #6

Background

Hospital 6 was a 85-year-old university hospital located in the central area of Bangkok. The hospital belonged to a not-for-profit organization; however, due to its close tie to a public university and the nature of its funding, which came from the governmental budget, it was considered a public hospital. It had 1,443 beds with around 425 full-time medical staff and 370 medical residents, offering all medical specialty services. Annually, the hospital served approximately 1.2 million outpatients and 50,000 inpatients. However, statistics with regard to insurance status of the patients in 1998 were not available.

The hospital has become a main contractor of the social security scheme since 1991. The three major reasons that influenced the decision for enrollment included:

- The hospital administrators considered the scheme as the national policy it should followed
- It seemed to be the right direction for providing health care, setting the example for others
- It was consistent with the hospital missions to provide medical services along with medical teaching and researches.

So far, the hospital has never had any subcontractor for its social security services since the hospital management thought that it is difficult to manage utilization and practice pattern and maintain quality at the subcontractor level. In 1998, Hospital 6 had around 80,000 registered beneficiaries.

Internal service management

- Organization structure to support the social security services

There was no new unit created for managing the SSS contract. However, there was a committee chaired by the deputy director (services) specifically appointed to manage the services for SSS patients. An acting, informal, program manager was responsible for the daily operation. A new service unit with 15 general practitioners was established as the gatekeepers. It serves 200-300 SSS patients a day. The hospital also arranged one inpatient ward for the SSS. All medical departments in the hospital involved in consultative services. The hospital revenue from the service was set aside as an internal revolving fund.

- Management of physicians for SSS

There were some changes in the specialty mix of physicians hired. Board-certified general practitioners have been hired to provide primary care services for SSS patients. They were paid on salary and act as gatekeepers for ambulatory services, and might refer patients to specialists for higher levels of care. However, they did not control cash, and they provided the services to other patients, as well.

The hospital was financed heavily by the governmental budget (nearly two-thirds of all the expenditure). Some of the SSS revenue was allocated to consultants and other hospital staff as special incentives, and was used in personnel and service development.

SSS and non-SSS physicians in the hospital were not monitored differently by the hospital in principle. However, they might belong to different medical departments that may apply slightly different

measures of utilization review processes, if any. The basic indicator for efficiency is an average length of stay for inpatients.

- Utilization review activities

The hospital applied number of utilization review measures to both SSS and non-SSS patients, including essential drug lists, and morbidity and mortality reviews. However, certain points should be noted. For non-SSS patients, the drug list was applied primarily to patients under the Civil Servant Medical Benefit Scheme (CSMBS). In addition, the details of the morbidity and mortality review activities could be slightly different among medical departments. The SSS patients were also monitored for patient complaints against physicians, but not for the non-SSS patients.

- Quality management

A number of quality assessment and assurance measures were applied in the hospital including:
1) Monitoring patient complaints about overall hospital care and waiting time
2) Analyzing the mortality profile of the hospital
3) Studying the trend of the rate of readmission
4) Monitoring the average length of stay
5) Working on fulfilling the hospital accreditation standards
6) Working on fulfilling the ISO 9000 standards

The quality assurance of the hospital encouraged that problems were addressed with inputs from the bottom-up process, and attempts to keep staff informed on recurring problems and provide training to overcome them. Regular monthly meetings were held among related operating units.

- Information and cost accounting system

A new information system was in preparation for the SSS by developing of the local-area-network and the medical record system. The purposes were to keep track of costs and maintain patient medical records for quality monitoring. The cost account system was effective in allocating periodic production costs between goods and services sold and goods still in inventory. It was used to address the use of resources comparing between different treatment modalities. However, the system could not allow for feed back on resources consumed or determining costs of individual products through out the entire value chains.

Main Contractor Hospital #7

Background

Hospital 7 was a private independent hospital located in an industrial area of Bangkok. The hospital has been in operation for 16 years and had 150 beds. It had about six full-time physicians and 30 part-time physicians, and provided services with all medical specialties. Some 28 percent of outpatients were social security beneficiaries while 66 percent of outpatients paid out-of-pocket and some 6 percent had private health insurance. For inpatient services, the out-of-pocket group accounted for 63 percent. Some 32 percent were social security patients whereas privately insured patients accounted for 5 percent.

The hospital has participated in the social security scheme as a main contractor since 1994. Three major reasons for the participation were:

1. To maintain the customer base because of the location of the hospital, half of the customers were factory and office employees
2. Feel more convenience to enroll in the social security scheme
3. The hospital agreed to join the scheme.

Internal service management

- Organization structure to support social security services

There was no new department or unit in management created for managing the SSS. There was no organizational structural change. No new administrative position was created for managing the SSS contract. The SSS did not lead to any decision to integrate vertically with subcontractors.

- Management of physicians for SSS

There was no change in the specialty mix of physicians hired as a result of SSS. No physician was specifically assigned to provide care to SSS patients. There was no rigorous performance monitoring applied to physicians, not matter which groups of patients they saw.

Different modes of physician payment were used for SSS and non-SSS patients. Basically for non-SSS patients, physicians were paid on fee-for-services. By contrast, for SSS patients, they were paid on capitation.

- Utilization review activities

Utilization review and efficiency measurement was primarily applied to SSS patients, but not non-SSS patients. While the hospital used random checking of medical records and monitoring number of medical mishaps for all patients, the hospital applied pre-admission authorization, essential drug lists and patient complaints about physicians to SSS patients only.

- Quality management

A number of quality assessment and assurance measures were applied in the hospital including:
1) Monitoring patient complaints about overall hospital care and waiting time
2) Studying the trend of the rate of readmission
3) Monitoring the average length of stay by diagnosis group.

The quality assurance of the hospital encouraged that problems were addressed with inputs from the bottom-up process. The hospital kept staff informed on recurring problems and provided training to overcome them.

- Information and cost accounting system

No new information system was set up in preparation for the SSS.

Subcontractor management

- Contracting services

Since 1994, the hospital has formed a network of subcontractors to provide ambulatory care consultation, minor ambulatory surgery and minor emergency care for the SSS patients. The

subcontractors comprised private for-profit and not-for-profit clinics and polyclinics. The numbers in 1994-1998 were 2, 4, 5, 7 and 7, respectively.

- Subcontractor payment

The hospital paid subcontractors primarily on a per-visit basis and based on fee schedules. The examples were as follows:

Baht 145 for the first ambulatory visit
Baht 65 for a follow-up visit within one week
Baht 120 for a incision and drainage procedure
Baht 35 for a wound care.
There was no preset monthly or yearly payment limit.

- Utilization review

Utilization review measures were applied to the subcontractors. Claim statistics from subcontractors were closely monitored along with retrospective chart review for unusual practice pattern. However, there was no expert to override the decisions of individual physicians. Pre-authorizations were required for referral such that high-cost cases were referred to the main contractor only.

- Quality management

A few approaches of quality management were put to use with subcontractors, including monitoring number of medical mishaps and patient complaints, sets of documented practice protocols and regular meetings with subcontractors, as well as occasional on-site visits.

Main Contractor Hospital #8

Background

Hospital 8 was a 20-year-old hospital located in a district of a province in the central region of Thailand. The hospital belonged to the Ministry of Public Health, had 160 beds with 20 full-time physicians and one part-time physician, offered care in internal medicine, surgery orthopedics, otonasolaryngology, ophthalmology, obstetrics and gynecology and pediatrics.

The service statistics of the hospital in 1998 were as follows:

	Outpatient services	Inpatient services
SSS patients	12	8
Civil-servant patients	18	12
Privately insured patients	<1	<1
Health card holders	16	14
Out-of-pocket patients	20	22
Other	24	44

The hospital has become a main contractor of the social security scheme since 1991. Major three reasons that influenced the decision for enrollment included:

- It was a national policy that became the hospital administrator policy. It was seen as the right direction for providing health care
- It provided revenue to support the hospital

- The social security scheme helped increase number of patients.

Internal service management

- Organization structure to support social security services

The hospital set up a new committee to manage SSS. There was also a new positions, the director of SSS, created for managing the SSS contract. There was no department or no administrative position reconfigured as a result of SSS.

- Management of physicians for SSS

There was no change in the specialty mix of physicians hired as a result of SSS. No physician was specifically assigned to provide care to SSS patients. Physicians who took care of SSS patients did not get paid differently from others. Physicians were paid on salary. But, they acted as gatekeepers at the outpatient department of the hospital and may refer the patients to specialists. They did not control cash, however.

- Utilization review activities

SSS and non-SSS physicians were not monitored differently in principle. They were not subject to different forms of utilization review.

- Quality management

A number of quality assessment and assurance measures were applied in the hospital including:
1) Monitoring patient complaints about overall hospital care and waiting time
2) Analyzing the mortality profile of the hospital
3) Studying the trend of the rate of readmission
4) Monitoring the average length of stay
5) Working on fulfilling the hospital accreditation standards

The quality assurance of the hospital encouraged that problems were addressed with inputs from the bottom-up process, and attempts to keep staff informed on recurring problems and provide training to overcome them.

- Information and cost accounting system

A new information system was set up in preparation for the SSS including a balance sheet, an income statement and expenses of contracted network providers. The hospital's local-area-network used a minicomputer to keep track of costs, to facilitate electronic patient billing and to enable efficient resource management.

The cost account system was used to allocate periodic production costs between goods and services sold and goods still inventory.

Subcontractor management

- Contracting services

The hospital has formed a network of subcontractors for its social security services since 1991. During 1991-1996, the subcontractors included 15 community hospitals and 206 district health centers. In 1997 and 1998, private clinics were included into the network. Subcontractors were allowed to provide ambulatory care, emergency care, and medical and surgical inpatient services.

- Subcontractor payment

Public health centers were paid fee-for-services. Global budget was applied to public community hospitals. Private clinics and polyclinics were paid by a per-visit fixed payment. Payment withholds were applied to all groups of the subcontractors.

- Utilization review

Claim statistics monitoring and retrospective chart review were used. However, there was no expert review to override the decisions of individual physicians. High-cost cases must be transferred to the main contractor. Public-hospital and health-center subcontractors had to ask for permission for diagnostic tests

- Quality management

The only reported quality assurance for subcontractors was monitoring of patient complaints.

Main Contractor Hospital #9

Background

Hospital 9 was a 17-year-old university hospital located in the southern part of Thailand. The hospital belonged to the Faculty of Medicine of a public university. It had 750 beds with around 325 full-time medical staff, offering all medical-specialty services. The service statistics of the hospital were as follows:

	Outpatient services	Inpatient services
SSS patients	2.8	1.5
Civil-servant patients	6.0	39.0
Privately insured patients	N/A	N/A
Health card holders	0.7	2.7
Out-of-pocket patients	87.3	50.8
Other	3.2	6.0

The hospital has become a main contractor of the social security scheme since 1991. The major reasons that influenced the decision for enrollment included:

- The hospital administrators considered the scheme as the national policy it should followed
- It seemed to be the right direction for providing health care, setting the example for others
- It was consistent with the hospital missions to provide medical services along with medical teaching and research
- It was the government-owned hospital.

So far, the hospital has never had any subcontractor for its social security services since the hospital might have difficult to manage utilization and practice pattern and maintain quality at the subcontractor level.

Internal service management

- Organization structure to support the social security services

There was no new unit created for managing the SSS contract. There was also no new administrative position created as a result of SSS. There was no reconfiguration of the hospital management structure.

- Management of physicians for SSS

There was no change in the specialty mix of physicians hired. No specific physician was assigned to SSS patients. Physicians who provided care to SSS patients were paid on salary, not differently from others. They acted as gatekeepers for ambulatory services, and might refer patients to specialists. But they did not control cash.

SSS and non-SSS physicians in the hospital were not monitored differently by the hospital in principle. However, they might belong to different medical departments that may apply slightly different measures of utilization review processes. The emergency room was directly under the hospital administration body. The outpatient department involved both the hospital administration and other departments of the Faculty of Medicine. The inpatient services were primarily the responsibilities of medical departments of the Faculty.

- Utilization review activities

SSS and non-SSS physicians were not subject to different forms of utilization review. Basically, an average length of stay of inpatients was monitored closely as an indicator of efficiency.

- Quality management

A number of quality assessment and assurance measures were applied in the hospital including:
1) Monitoring patient complaints about overall hospital care and waiting time
2) Analyzing the mortality profile of the hospital
3) Studying the trend of the rate of readmission
4) Monitoring the average length of stay
5) Fulfilling the hospital accreditation standards

The quality assurance of the hospital encouraged that problems were addressed with inputs from the bottom-up process, and attempts to keep staff informed on recurring problems and provide training to overcome them. Regular monthly meetings were held among related operating units, having the deputy director (Service) as the chairman.

- Information and cost accounting system

A new information system was in preparation for the SSS by developing of the local-area-network and the medical record system. The purposes were to keep track of costs, to maintain patient medical records for quality monitoring, to facilitate electronic patient billing and to enable efficient

resource management. At that time, there was no effective cost account system to allocate periodic production costs between goods and services sold and goods still in inventory, to provide feedback on resources consumed or to address the use of resources by comparing between different treatment modalities.

Main Contractor Hospital #10

Background

Hospital 11 was a 18-year-old general hospital located in the suburban area of Bangkok. The hospital belonged to the Ministry of Public Health, having 510 beds with approximately 68 full-time physicians and nine part-time physicians. The hospital provided services with all medical specialties.

The hospital has become a main contractor of the social security scheme since 1991. Major three reasons that influenced the decision for enrollment included that:

- The hospital was a public hospital; it should co-operate with the governmental policy
- It was an opportunity to generate additional revenue
- It was seen as an opportunity to develop the hospital.

In 1998, approximately 5.3 percent of outpatients and 1.9 percent of inpatient cases were SSS patients.

Internal service management

- Organization structure to support social security services

There was a new informal office set up for managing the SSS contract. But, there was no new positions in management created.

- Management of physicians for SSS

As a result of the SSS, there was a change in the specialty mix of physicians hired by the hospitals. The hospital hired more general practitioners for primary care services. However, no physician was specifically assigned to SSS patients.

Normally, physicians were on salary. The hospital did not pay physicians who took care of SSS patients different from non-SSS patients, except for surgical inpatient services. All physicians got bonus payments related to the profit of the hospital from SSS.

- Utilization review activities

Services provided to SSS and non-SSS patients were subject to similar utilization review and efficiency measurement.

- Quality management

A number of quality assessment and assurance measures were applied in the hospital including:

1) Monitoring patient complaints about overall hospital care and waiting time;
2) Fulfilling the hospital accreditation criteria.

The quality assurance of the hospital encouraged that some problems were addressed with inputs from the bottom-up process.

- Information and cost accounting system

The hospital did not set up a new information system specifically in preparation for the SSS. However, it had a local-area-network to facilitate electronic patient billing, to enable efficient resource management and to provide expert systems for clinical decision making. Greater demand for accurate and up-to-date information on cost, procedures and outcome was realized after enrollment in the social security scheme.

The cost account system was effective in allocating periodic production costs between goods and services sold and goods still in inventory, providing feedback on resources consumed and determining costs of individual products throughout its entire value-added chain. However, it was not used to address the use of resources in comparing between sites or treatment modalities.

Subcontractor management

- Contracting services

The hospital has formed a network of subcontractors for its social security services for years, which included private clinics and polyclinics, public health centers, as well as private and public hospitals. The social security scheme did not lead to any decision to vertically integrate with subcontractors. However, information on the number of subcontractors and types of contracted services was not provided.

- Subcontractor payment

Fee-for-service and fixed per-visit payments were applied for paying subcontractors. There was no other performance-related payment, such as bonus or withhold.

- Utilization review

Utilization review programs were applied to subcontractors. A group of experts was set to oversee and override the decisions of individual physicians at private clinic and polyclinic subcontractors. Permission for referral was also required for clinics and polyclinics.

- Quality management

Quality assurance for subcontractors included random checking of medical records, monitoring of patient complaints, sets of documented practice protocols (required for public hospitals), and regular meetings with subcontractors (required for private hospitals). There was no specific quality assurance requirement for public hospitals and health centers.

Main Contractor Hospital #11

Background

Hospital 10 was a 47-year-old general hospital. The hospital was located in a mixed residential–commercial area of Bangkok. It belonged to the Bangkok Metropolitan Administration, had 400 beds with approximately 80 full-time physicians and one part-time physician. It could offer care in all medical specialties except neurosurgery, cardiology, geriatrics and psychiatry.

The hospital has been a main contractor of the social security scheme since 1991. The major reasons that influenced the decision for enrollment included:

- The public hospital must serve patients regardless the source of payment.
- It was the governmental policy.

In 1998, the proportion of social security outpatients of the hospital was 5.4 percent, while the proportion for inpatients was 20.76 percent.

Internal service management

- Organization structure to support social security services

The hospital set up a new administrative and service unit for SSS patients. It consisted of eight examining rooms. A social security service committee was created for managing the contract. Some new clerks were recruited.

- Management of physicians for SSS

There was no change in the specialty mix of physicians hired as a result of SSS. No physician was specifically assigned to provide care to SSS patients. Generally, physicians of the hospital were paid on salary. Bonus payments related to the SSS performance of the hospital were paid to everyone except physicians. Physicians and nurses received additional fees for providing care of SSS patients, but not for non-SSS patients. Fee schedules were available in terms of fixed amounts of payment for periods of services, or credit points for particular diagnostic and treatment procedures.

- Utilization review activities

Physicians were subject to utilization review and efficiency measurement in services provided to both SSS and non-SSS patients. Utilization review included essential drug lists, practice guidelines, random checking of medical records, and patient complaints.

- Quality management

A number of quality assessment and assurance measures were applied in the hospital including:

1) Working on fulfilling the hospital accreditation standards
2) Fulfilling the ISO 9000 criteria for outpatient services.

The quality assurance of the hospital encouraged that problems were addressed with inputs from the bottom-up process. Hospital staff was informed on recurring problems. Training was provided to overcome the problems.

- Information and cost accounting system

There was no new information system set up in preparation for the SSS. No greater demand for accurate and up-to-date information on cost, procedures and outcome was reported although there was no effective cost accounting system in the hospital.

Subcontractor management

- Contracting services

The hospital has formed a network of subcontractors for its social security services since 1995. The network comprised only nine private clinics in 1998. The number declined to seven in 1999. Subcontractors were allowed to provide only ambulatory non-surgical care. No attempt was planned for vertically integrating with the subcontractors.

- Subcontractor payment

Private clinics were paid with a fixed per-visit payment. The amount was Baht 150 per visit in 1996. It was increased to Baht 170 in 1999. There was no performance payment, such as bonus or withholds.

- Utilization review

Subcontractor was subject to some utilization review. A group of experts was set up to oversee and override decisions of individual physicians on drug use. Permission for referral was sometime conducted on a case-by-case basis. Physicians of the main-contractor hospital will review the request for some diagnostic tests. Experimental procedures required permission with conditions.

- Quality management

Random checking of medical records was implemented. There were regular meetings with subcontractors.

Main Contractor Hospital #12

Background

Hospital 12 was a 33-year-old community hospital of the Ministry of Public Health. It was located in the vicinity province of Bangkok. It had 180 beds with around 15 full-time and 12 part-time medical staff, offering all medical-specialty services except psychiatry and cardiology. However, it had Thai massage and acupuncture services.

Despite being the governmental hospital, this hospital was allowed to manage in semi-private manner.

The hospital has become a main contractor of the social security scheme since 1993. The major reasons that influenced the decision for enrollment included that:

- There was increase in market competition in the area;
- Hospital quality was improved by being a main contractor;

- The social security fund should go to public hospitals rather than private ones.

Internal service management

- Organization structure to support the social security services

There was a new department created for managing the SSS contract. The department was responsible for public relation, marketing, contacting and reporting to the Social Security Office. It also took care of the hospital's subcontractor network, data collection, expenditure monitoring and reimbursement, quality control, as well as coordinating with other health facilities. There were four new administrative positions created as a result of SSS, including the head of the department, the secretary, the statistics officer and the marketing and public relation officer. There was no other reconfiguration of the existing hospital management structure.

- Management of physicians for SSS

As a result of SSS, more general practitioners and surgeons were hired. However, they were not specifically assigned to SSS patients. No specific physician was assigned to SSS patients.

The hospital used the same system to monitor performances of physicians who took care of SSS and non-SSS patients.

- Utilization review activities

SSS and non-SSS physicians were not subject to different forms of utilization review.

- Quality management

A number of quality assessment and assurance measures were applied in the hospital including:
1) Monitoring patient complaints about overall hospital care and waiting time
2) Analyzing the mortality profile of the hospital
3) Studying the trend of the rate of readmission
4) Monitoring the average length of stay
5) Fulfilling the hospital accreditation standards

The quality assurance of the hospital encouraged that problems were addressed with inputs from the bottom-up process, and attempts to keep staff informed on recurring problems and provide training to overcome them.

- Information and cost accounting system

A new information system was in preparation for the SSS by developing of the local-area-network. The purposes were to keep track of costs, to maintain patient medical records for quality monitoring, to facilitate electronic patient billing, to enable efficient resource management, and to provide expert systems for clinical decision making.

After SSS, there was a greater demand for accurate and up-to-date information on cost, procedures and outcome. The current cost account system was effective in providing feedback on resources consumed. It was used to address the use of resources by comparing among sites. But, it was

not effective in allocating periodic production costs between goods and services sold and goods still in inventory, or determining costs of individual products throughout its entire value-added chain.

Subcontractor management

- Contracting services

The hospital has developed a network of subcontractors for its social security services since 1995. It includes private clinics and polyclinics, public health centers, as well as private and public hospitals. Subcontractors could provide ambulatory consultation, emergency services, medical and surgical inpatient services, ambulatory surgery and obstetric services. The social security scheme did not lead to any decision to vertically integrate with subcontractors. However, information on the number of subcontractors was not provided.

- Subcontractor payment

Fee-for-service payments were applied for paying subcontractors. There was no other performance-related payment, such as bonus or withhold.

- Utilization review

Utilization review programs were applied to subcontractors. A claim form normally included the following information: patient diagnosis and treatment data (on a daily basis).

A group of experts was set to oversee and override the decisions of individual physicians at private clinic, polyclinic and private hospital subcontractors. Permission for referral was also required for private and public hospitals. Permission for diagnostic tests was required for private hospitals. However, there was no wide-area computer network between the main contractor and subcontractors.

- Quality management

Quality assurance for subcontractors included random checking of medical records (only for private clinics, polyclinics and hospitals), producing mortality profiles of subcontractors, monitoring of medical mishaps (except for health centers), monitoring of patient complaints (except for health centers), and sets of documented practice protocols (required for private clinics, polyclinics and hospitals).

In case of a wrongful diagnosis, the main contractor would transfer the patient to the hospital and take a responsibility to take care of him.

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